WJEC GCSE METHODS IN MATHEMATICS

# MATHS



## EXAM QUESTION PACK

UNIT 2 FOUNDATION TIER 4364 PAPERS

STEMUP

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|---|---|---|
| Other Names | | 0 |

# GCSE LINKED PAIR PILOT

4364/01

S16-4364-01

# METHODS IN MATHEMATICS

## UNIT 2: Methods (Calculator)
## FOUNDATION TIER

A.M. TUESDAY, 14 June 2016

1 hour 30 minutes

| For Examiner's use only | | |
|---|---|---|
| **Question** | **Maximum Mark** | **Mark Awarded** |
| **1.** | **4** | |
| **2.** | **4** | |
| **3.** | **5** | |
| **4.** | **4** | |
| **5.** | **8** | |
| **6.** | **7** | |
| **7.** | **6** | |
| **8.** | **4** | |
| **9.** | **7** | |
| **10.** | **6** | |
| **11.** | **8** | |
| **12.** | **5** | |
| **13.** | **3** | |
| **14.** | **5** | |
| **15.** | **4** | |
| **Total** | **80** | |

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### ADDITIONAL MATERIALS

A calculator will be required for this paper.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take $\pi$ as 3·14 or use the $\pi$ button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **5**.

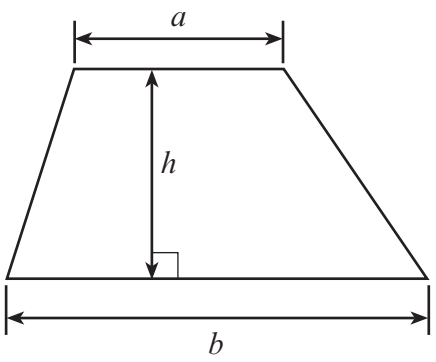
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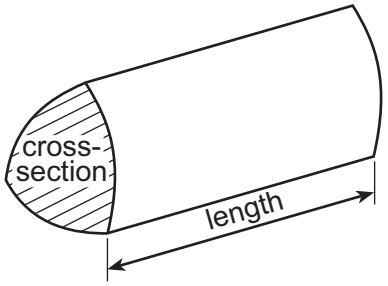
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## Formula List

**Area of trapezium** $= \frac{1}{2}(a + b)h$




**Volume of prism** = area of cross-section × length




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**1.** Fill in the missing numbers. [4]

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | + | 5 | 1 | = | 7 | 3 | |
| | | − | 2 | 6 | = | 5 | 5 | |
| | | × | 1 | 5 | = | 9 | 4 | 5 |
| | | | ÷ | 1 | 1 | = | 1 | 1 |

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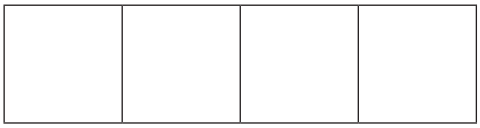


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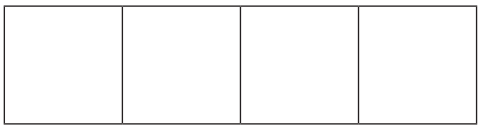
**Turn over.**

Examiner only

**2.** *(a)* Write down the **smallest** four-digit number that can be written using all the digits 6, 1, 5 and 8. [1]



*(b)* Write down the **largest even** four-digit number that can be written using all the digits 6, 1, 5 and 8. [1]



*(c)* In the following list, draw a circle around each number that has the same value as 0·5. [2]

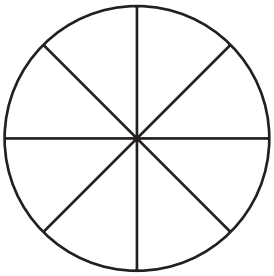
**5%** **50%** $\frac{5}{100}$ $\frac{1}{2}$ **0·5%**

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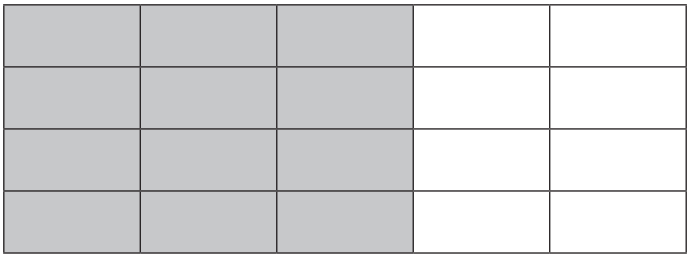
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**3.** *(a)* (i) Shade $\frac{3}{4}$ of the following shape. [1]



(ii) What **percentage** of the following shape is shaded? [2]



.....

..... %

*(b)* Fill in the missing fractions in the grid below. [2]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1** | | | | | | | |
| ..... | | | | | | | |
| **$\frac{1}{4}$** | | | | | | | |
| ..... | | | | | | | |

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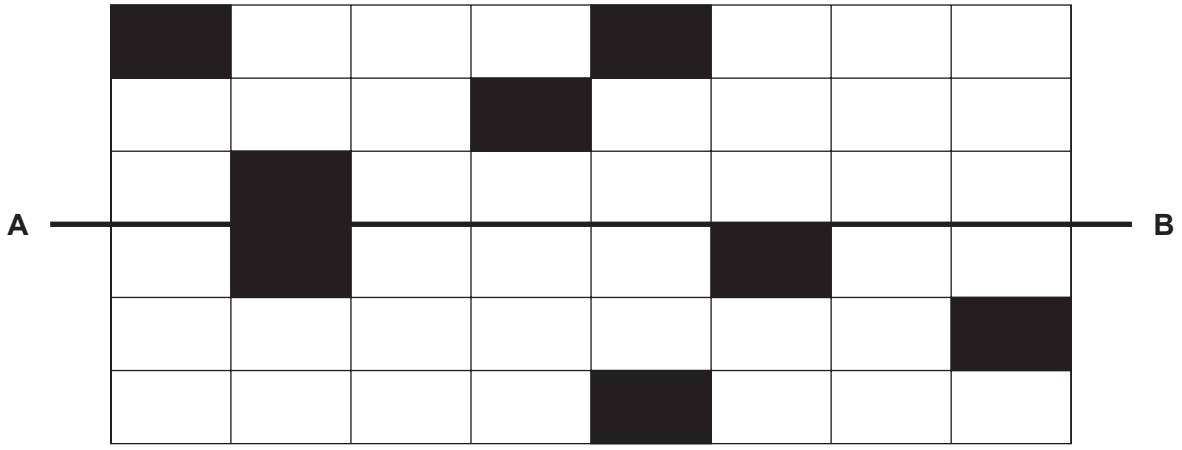
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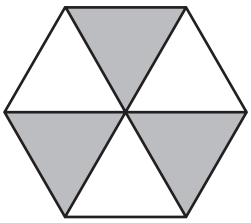
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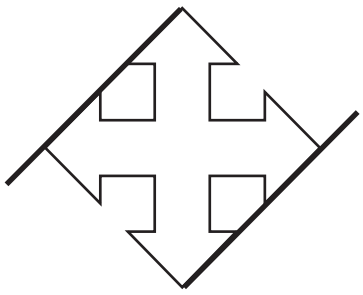
**4.** *(a)* Fill in the smallest number of boxes to make the following diagram symmetrical about the line **AB**. [2]




*(b)* Write down the order of rotational symmetry of each of the shapes below. [2]



Order of rotational symmetry = .....



Order of rotational symmetry = .....

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**5.** *You will be assessed on the quality of your written communication in this question.*

**165 pupils and 18 teachers are going on a school trip.**

The school has 3 minibuses.
There are 16 seats in each minibus.
They need to hire some coaches, so that they can take everyone on the school trip.
These coaches each have 45 seats.

There must be 2 teachers on each minibus.
The remaining teachers must be shared equally between all the other coaches.

- In addition to the 3 minibuses, how many coaches will be needed?
- How many pupils and teachers will be on each coach?

You must show all your working. [8]



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**6.** *(a)* Calculate the area of the following rectangle.
Give the units of your answer. [3]




*Diagram not drawn to scale*

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*(b)* The length of one side of a square is 9 cm.
An equilateral triangle has the same perimeter as this square.
What is the length of one side of the equilateral triangle? [4]

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**7.** *(a)* Fill in the missing values so that the solution to each of the following equations will be

$$x = 10$$

The first one has been done for you. [4]

$x \div \ldots 2 \ldots = 5$

$x - \ldots\ldots = 9$

$x + \ldots\ldots = 16$

$\ldots\ldots + x = -2$

$4x = \ldots\ldots$

*(b)* Write down an equation that gives the solution $x = 3$. [1]

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*(c)* Write down an equation that gives the solution $x = -10$. [1]

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**8.** *(a)* Find the value of $43{\cdot}7^2 - \sqrt{9671{\cdot}3}$ .
Write your answer correct to 2 significant figures. [2]

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*(b)* Find the value of $\frac{5}{0{\cdot}3^2}$ .

Write your answer correct to 1 decimal place. [2]

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.....

**9.** *(a)* Find 8·9% of 589. [2]

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*(b)* Find $\frac{3}{7}$ of 917. [2]

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*(c)* Which of the fractions $\frac{2}{3}$ , $\frac{7}{8}$ , or $\frac{9}{12}$ is nearest to $\frac{5}{6}$?

You must show all your working. [3]

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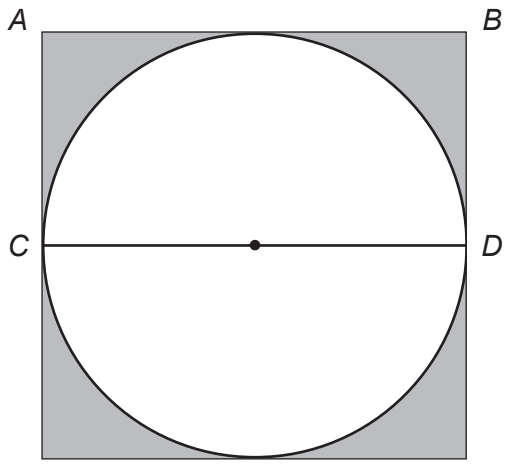
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**10.** The following shape is a circle within a square.




*(a)* The line *AB* is a side of the square.
It also has a special name in relation to the circle.
Fill in the blank below.

The line *AB* is a ..... to the circle. [1]

*(b)* What is the special name given to the line *CD*? [1]

.....

*(c)* The length of *AB* is 20 cm.
Calculate the area of the shaded region in the diagram above. [4]

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Area = ..... $cm^2$

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**Turn over.**

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**11.** *(a)* Solve $\frac{x}{5} = 25$. [1]

*(b)* Solve $4t - 12 = 8$. [2]

*(c)* Solve $\frac{72}{x} = 9$. [1]

*(d)* Solve the inequality $6x + 4 < 100$. [2]

*(e)* Write down the greatest whole number that satisfies the inequality $3x < 81$. [2]

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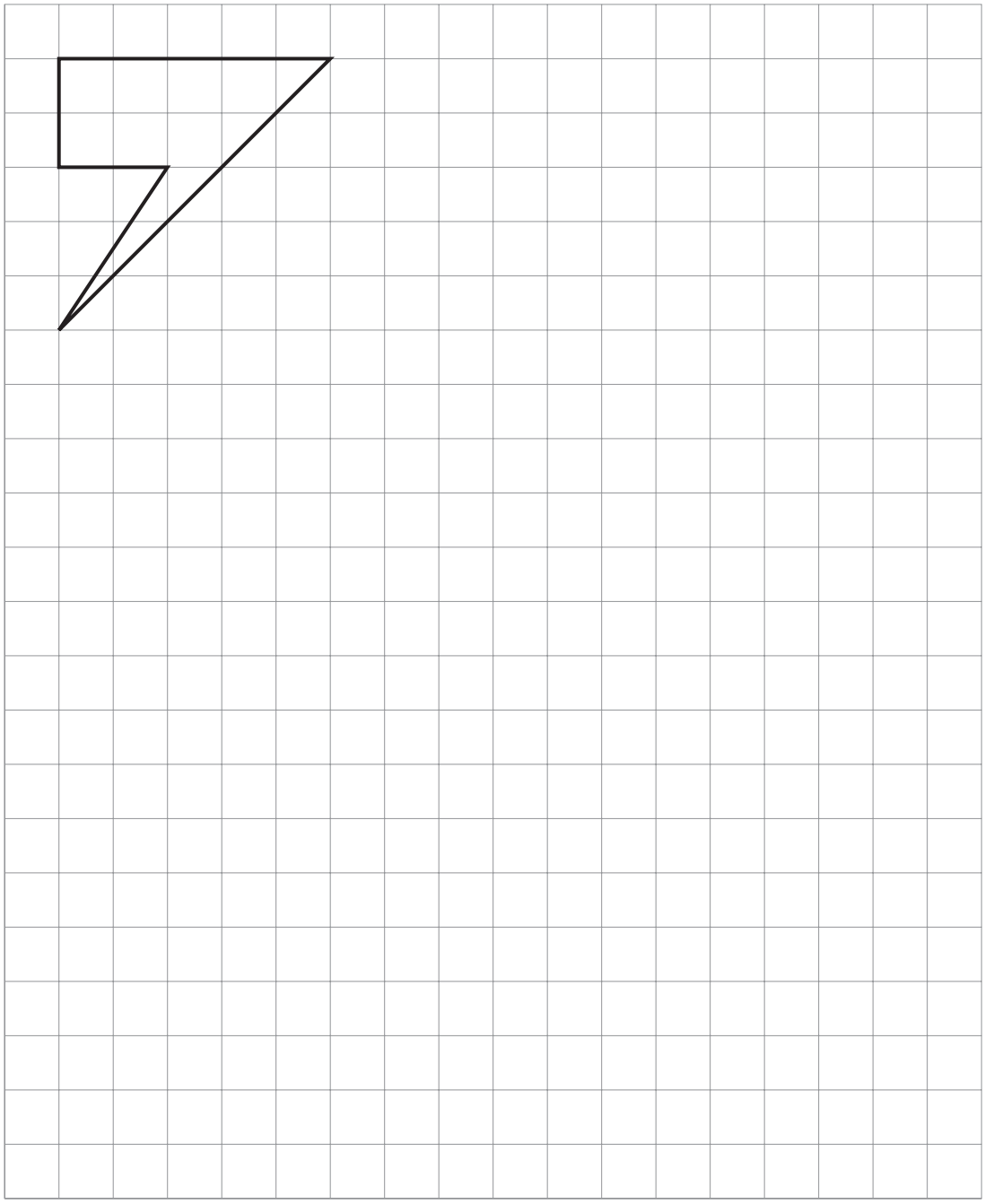
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**12.** *(a)* Enlarge the following shape by a scale factor of 2. [2]



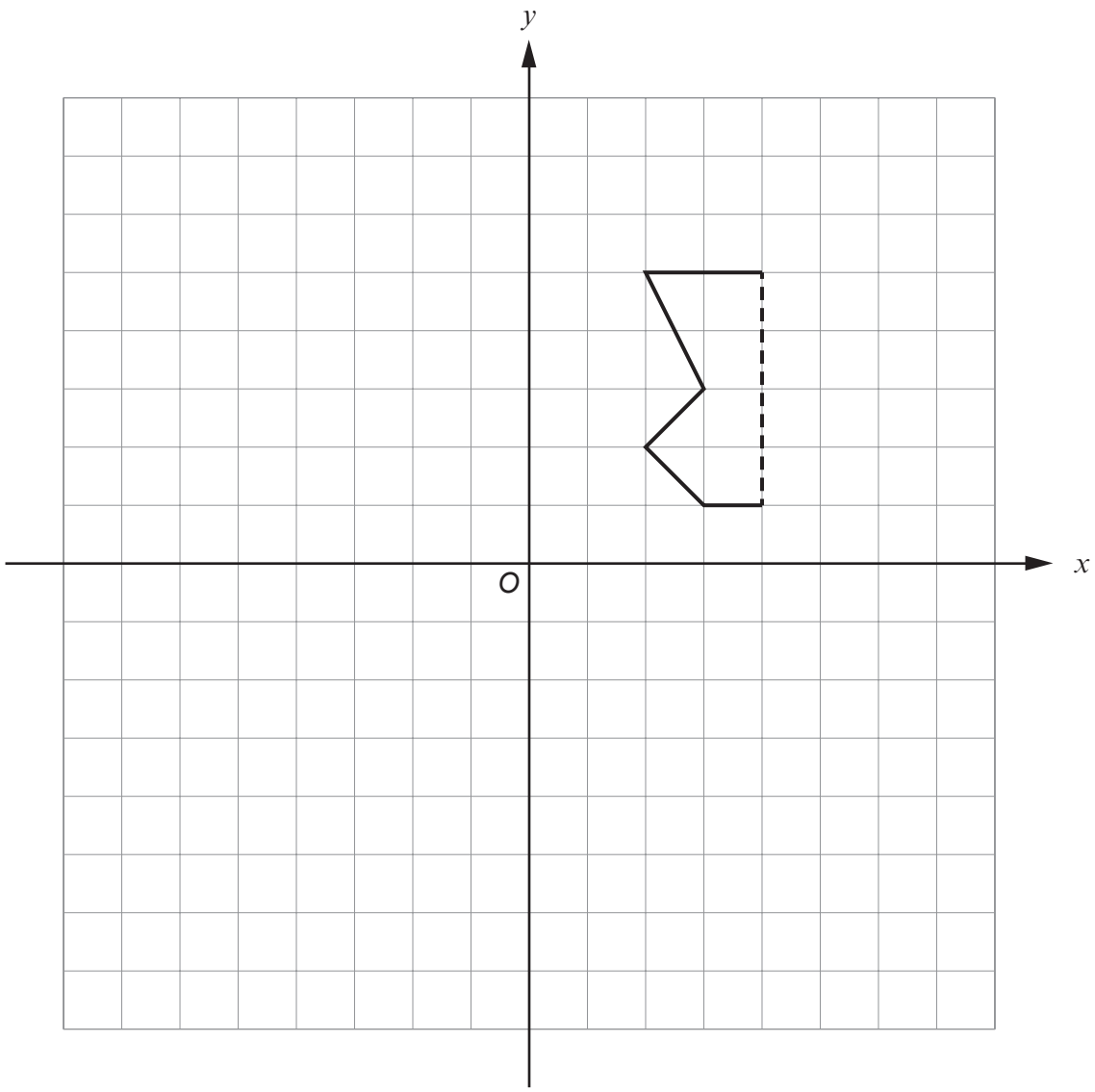
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*(b)* Part of a shape is shown on the grid.
The dotted line is the line of symmetry of the shape.
Complete the drawing of the shape and then rotate your complete shape through 180° about the origin. [3]



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**13.** The diagram shows a 6-sided shape.

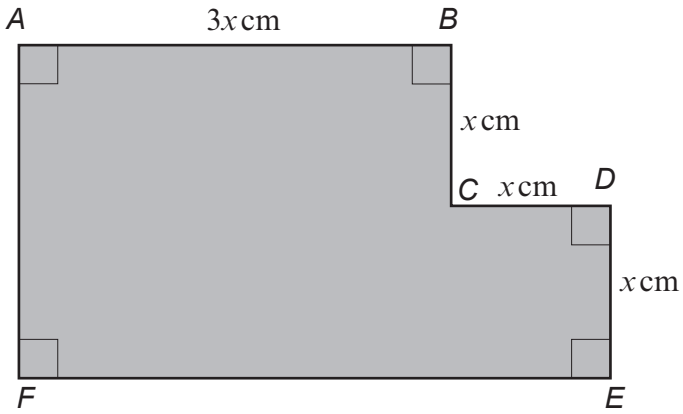



*Diagram not drawn to scale*

*(a)* Write down the length of *FE* in terms of $x$. [1]

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*(b)* The perimeter of the 6-sided shape is 480 cm.
Find the value of $x$. [2]

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**14.**

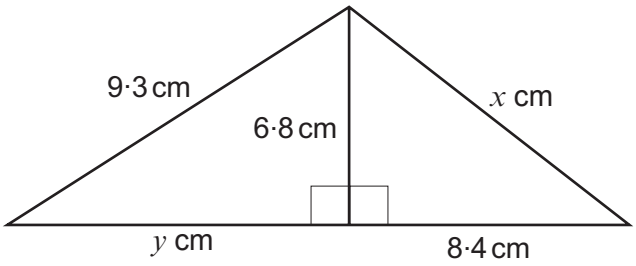



*Diagram not drawn to scale*

Calculate $x$ and $y$.
You must show all your working. [5]

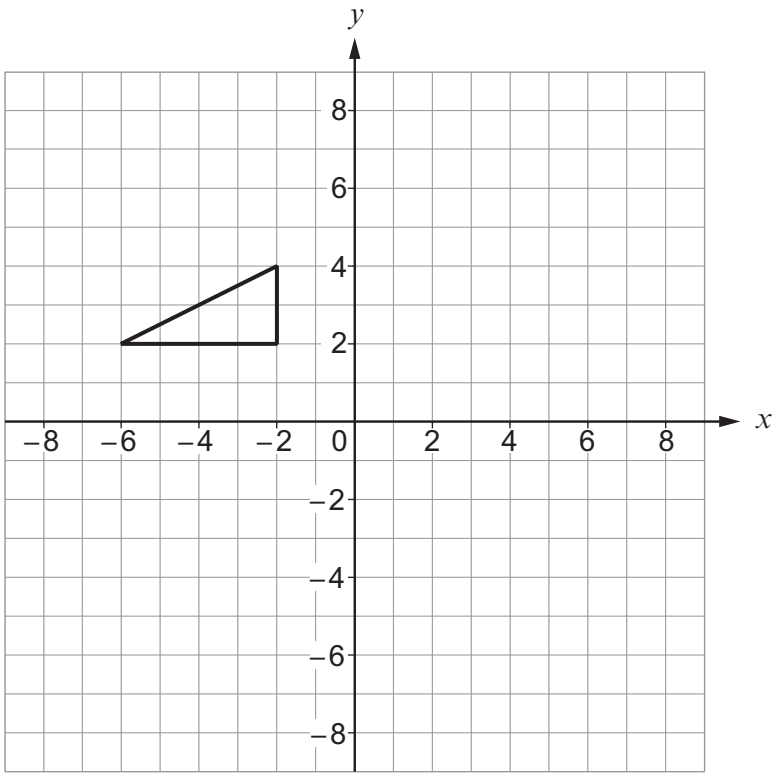
$x$ = ..... cm $y$ = ..... cm

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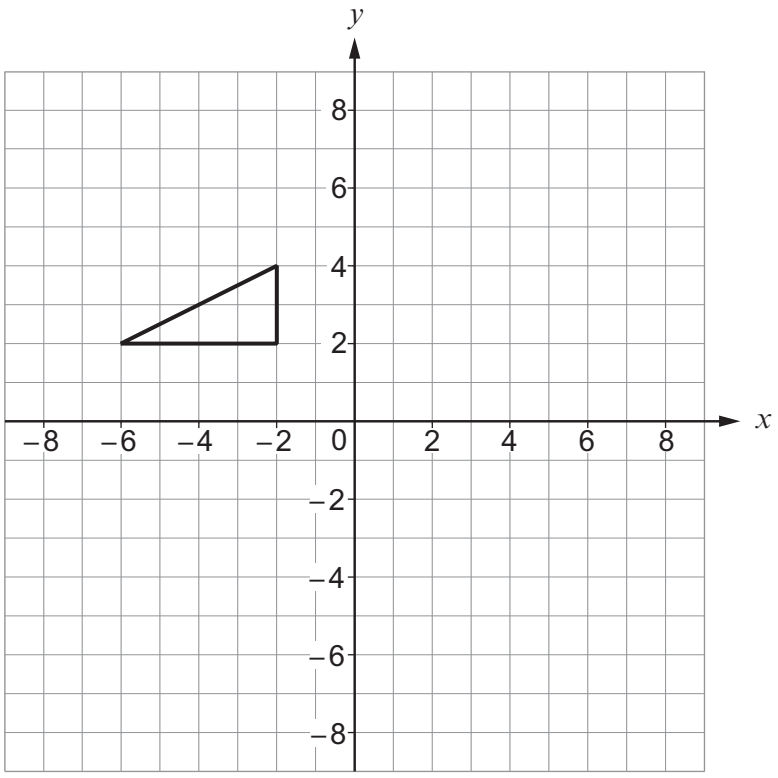
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**15.** *(a)* Rotate the triangle through 90° clockwise using the point (2, 0) as the centre of the rotation. [2]




*(b)* Reflect the triangle shown in the line $y = x$. [2]




**END OF PAPER**

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# GCSE MARKING SCHEME

## SUMMER 2016

## GCSE MATHEMATICS LINKED PAIR METHODS
## UNIT 2 FOUNDATION
## 4364-01

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## INTRODUCTION

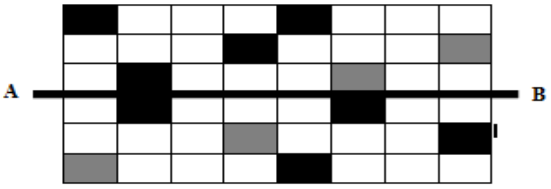
This marking scheme was used by WJEC for the 2016 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

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# METHODS IN MATHEMATICS
# UNIT 2 (FOUNDATION TIER) - SUMMER 2016

| Methods in Mathematics<br>Unit 2 Foundation Tier | Mark | Comments |
|---|---|---|
| 1. 22<br>81<br>63<br>121 | B1<br>B1<br>B1<br>B1<br>4 | |
| 2. (a) 1568<br>(b) 8516<br>(c) 50% and 1/2 | B1<br>B1<br>B2<br><br>4 | <br><br>B1 for 1 correct and no more than 1 incorrect<br>B1 for 2 correct and 1 incorrect |
| 3(a) (i) Correct shading<br>(ii) 12/20 × 100(%)<br>60(%)<br><br>(b) ½ and 1/8 | B1<br>M1<br>A1<br><br>B2<br><br>5 | Any 6 sectors shaded<br>or equivalent<br><br><br>or equivalent<br>B1 for each correct entry |
| 4(a)<br><br><br><br>(b) 3<br>2 | B2<br><br><br><br><br><br><br><br>B1<br>B1<br><br>4 | B1 for 4 correct and 1 incorrect<br>OR for 2 or 3 correct and up to 1 incorrect<br>OR for 6 shaded to produce a symmetrical diagram |

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| Methods in Mathematics<br>Unit 2 Foundation Tier | Mark | Comments |
|---|---|---|
| 5. (3 minibuses have) 48 (seats)<br>(1 minibus) 2 teachers 14 pupils OR<br>(3 minibuses) 6 teachers 42 pupils<br>(Total left) 135 or 12 teachers and 123 pupils left<br>135/45<br>=3 (coaches)<br>4 teachers AND 41 pupils on each coach | B1<br>B1<br><br>B1<br>M1<br>A1<br>B1 | <br>Implies 1st B1<br><br>FT 'their 48'<br>FT 'their 165+18-3×16' / 45<br><br>Implies first three B marks<br><br>*Allowance for extra driver's seat – gets full marks.*<br>Award B1 B0 B1 M1 A1 B1 for<br>(3 minibuses have) 48 pupils<br>(Total left) 117 pupils with 12 teachers<br>129/3<br>= 43 (seats)<br>4 teachers AND 39 pupils on each coach<br>OR<br>(3 minibuses have) 48 pupils<br>(Total left) 117 pupils with 18 teachers<br>135/45<br>3 (coaches)<br>then<br>6 teachers and 39 pupils on each coach |
| Look for:<br><br>Clear and detailed method and explanations throughout.<br>Labelling to aid communication | | |
| QWC2: Candidates will be expected to<br>• present relevant work clearly, with words explaining process or steps<br>AND<br>• make few if any mistakes in spelling, punctuation and grammar<br><br>QWC1: Candidates will be expected to<br>• present work clearly which is mostly relevant, with words explaining process or steps<br>OR<br>• make few if any mistakes in spelling, punctuation and grammar and include units in their final answer | QWC 2<br><br>8 | QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |

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| Methods in Mathematics<br>Unit 2 Foundation Tier | Mark | Comments |
|---|---|---|
| 6.(a) 21 × 13<br>273<br>cm² | M1<br>A1<br>U1 | <br><br>Independent mark |
| (b) 9 × 4 or 9+9+9+9<br>36(cm)<br>36/3<br>12(cm) | M1<br>A1<br>M1<br>A1<br>7 | <br><br>FT for 'their perimeter of the square' provided their perimeter ≥18 |
| 7.(a) 1<br>6<br>-12<br>40<br>(b) Any correct equation in $x$ with solution $x = 3$<br>(c) Any correct equation in $x$ with solution $x = -10$ | B1<br>B1<br>B1<br>B1<br>B1<br>B1<br>6 | |
| 8.(a) 1800<br>(b) 55.6 | B2<br>B2<br>4 | B1 for 1811.3(47232…) or 1800.0(000..)<br>B1 for 55.5(5555…) |
| 9. (a) 8.9/100×589<br>52.421<br>(b) 3/7 × 917<br>393<br>(c) For all 4 correct in forms which allow comparison<br>7/8 | M1<br>A1<br>M1<br>A1<br>M2<br>A1<br>7 | <br>Allow 52.(42)<br><br><br>Award M1 for 2 or 3 correct in a form which allows comparison e.g.<br>2/3 \| 7/8 \| 9/12 \| 5/6<br>16/24 \| 21/24 \| 18/24 \| 20/24<br>0.66(6..) \| 0.875 \| 0.75 \| 0.83(3..) |
| 10. (a) Tangent<br>(b) Diameter<br>(c) (20 × 20)= 400(cm²)<br>Π × 10²<br>314.(…..)(cm²)<br>(400-314.(…)=) 85.7 - 86(cm²) | B1<br>B1<br>B1<br>M1<br>A1<br>B1<br>6 | <br><br><br><br><br>FT 'their 20 × 20' (provided they are working with area) and 'their radius' if answer >0<br>If M0 A0 B0 then SC1 if 20 used for radius and 400-628 or (±)228 seen |

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| Methods in Mathematics<br>Unit 2 Foundation Tier | Mark | Comments |
|---|---|---|
| 11.<br>(a) (x=)125 | <br>B1 | Accept embedded answers in a, b and c |
| (b) 4t=20 or 4t=8 +12 or t-3=2<br>t=5 | B1<br>B1 | FT from 1 error. |
| (c) (x =) 8 | B1 | Mark final answer. Do not accept 72/9 |
| (d) 6x < 100 – 4 or 6x < 96 or 3x<50-2 or 3x<48<br>x< 16 | M1<br>A1 | No marks for use of "=", unless finally replaced to give x<16 then award M1 A1. SC1 for x<104/6 ISW |
| (e) x < 81/3 or x< 27 or 78 < 81<br>(x =) 26 | M1<br>A1<br><br>8 | Or sight of 3×26 = 78 with 3×27 =81 or equivalent divisions<br>Accept unsupported 26, or a unique answer of 26 from a trial and improvement method, or 3 × 26 < 81<br>Do not accept x<26.<br>*Allow sight of 3x = 81, x = 27 followed by selecting*<br>*x =26* |
| 12.(a) Enlargement of scale factor 2 | B2 | B1 for any two adjacent lines correct or 3 points correct<br>B1 for correct enlargement using different factor or B1 for a 'nearly correct' enlargement using scale factor 2 |
| (b) Shape completed accurately with correct rotation seen | B3<br><br>5 | With no other 90° rotations shown<br>B2 for at least two lines correct in attempting to complete the shape with correct rotation of their shape with no other 90° rotations shown, OR<br>B1 for the shape completed correctly, or a correct rotation of the part of the shape given, ignore other 90° rotations shown |
| 13(a) 3x + x OR 4x(cm)<br>(b) (x = ) 40 | B1<br>B2<br><br>3 | Mark final answer<br>FT for 8x + 'their FE' = 480<br>B1 for sight of 12x = 480 or equivalent informal notation |
| 14. $(x^2 =) 6.8^2 + 8.4^2$<br>$(y^2 =) 9.3^2 – 6.8^2$<br>$x^2 = 116.8$ or $\sqrt{116.8}$ OR $y^2 = 40.25$ or $\sqrt{40.25}$<br>x = 10.8(07…)<br>y = 6.3(44…) | M1<br>M1<br>A1<br>A1<br>A1<br>5 | <br><br><br>Accept 11 from correct working<br>Accept 6 from correct working |
| 15.(a) Correct rotation | B2 | B1 near miss of grid lines, or for anticlockwise 90° about (2, 0), or for clockwise 90° about (0, 2) |
| (b) Correct reflection in $y = x$ | B2<br><br>4 | B1 for sight of the line $y = x$ or a reflection in $y = -x$, |



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# GCSE LINKED PAIR PILOT

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# METHODS IN MATHEMATICS

## UNIT 2: Methods (Calculator)
## FOUNDATION TIER

A.M. MONDAY, 18 January 2016

1 hour 30 minutes

| For Examiner's use only | | |
|---|---|---|
| **Question** | **Maximum Mark** | **Mark Awarded** |
| **1.** | **3** | |
| **2.** | **4** | |
| **3.** | **4** | |
| **4.** | **7** | |
| **5.** | **5** | |
| **6.** | **6** | |
| **7.** | **5** | |
| **8.** | **3** | |
| **9.** | **2** | |
| **10.** | **13** | |
| **11.** | **5** | |
| **12.** | **5** | |
| **13.** | **3** | |
| **14.** | **7** | |
| **15.** | **5** | |
| **16.** | **3** | |
| **Total** | **80** | |

4364 010001

### ADDITIONAL MATERIALS

A calculator will be required for this paper.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take $\pi$ as 3·14 or use the $\pi$ button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **5**.

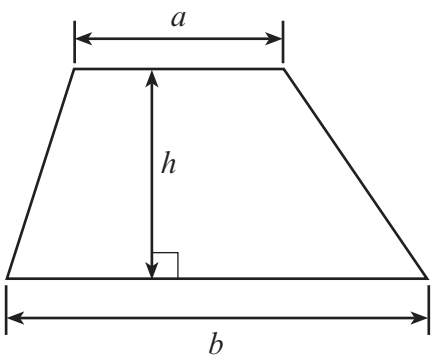
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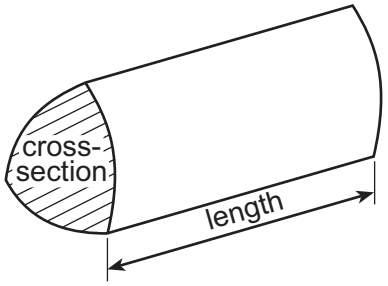
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## Formula List

**Area of trapezium** $= \frac{1}{2}(a + b)h$




**Volume of prism** = area of cross-section × length




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Examiner only

**1.** *(a)* Write down the **largest** four-digit number that can be written using all the digits 7, 1, 0 and 3. [1]

| | | | |
|---|---|---|---|
| | | | |

*(b)* Write down the **largest odd** four-digit number that can be written using all the digits 7, 1, 0 and 3. [1]

| | | | |
|---|---|---|---|
| | | | |

*(c)* Write down a four-digit number that is **divisible by 5** and can be written using all the digits 7, 1, 0 and 3. [1]

| | | | |
|---|---|---|---|
| | | | |

**2.** *(a)* In the following list, draw a circle around each number that has the same value as 0·9. [2]

**90%** **0·9%** $\frac{9}{1000}$ $\frac{9}{10}$ **0·09%**

*(b)* Use either the symbol < or > to make each statement true. [2]

3 ..... 7

–15 ..... 11

–4 ..... –5

**3.** *(a)* What is the remainder when 250 is divided by 8? [1]

.....

.....

*(b)* The length of a plank of wood is 5 m.
A piece of length 1·5 m is cut off one end of the plank.
The remaining plank is cut into 7 equal pieces.
How long is one of these 7 pieces? [3]

.....

.....

.....

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**Turn over.**

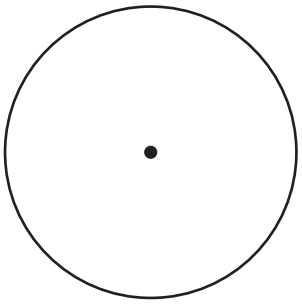
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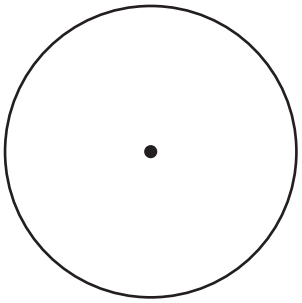
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**4.** *(a)* For each circle, draw the following: [3]

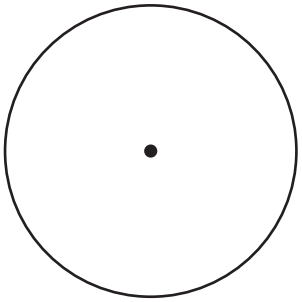
- a radius



- an arc



- a sector.



*(b)* What is the special name given to a chord which goes through the centre of a circle? [1]

.....

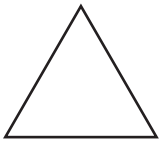
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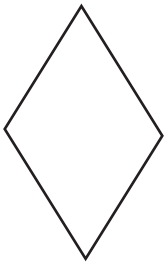
*(c)*



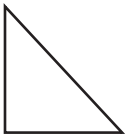
**A**



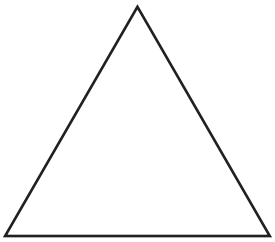
**B**



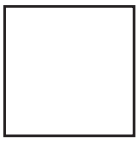
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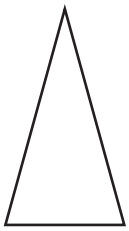
**D**



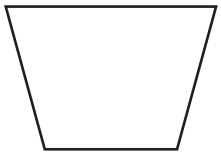
**E**



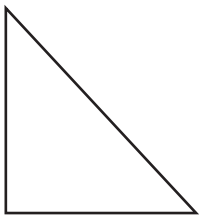
**F**



**G**



**H**



**I**

Use the diagrams above to identify and write down: [3]

- a pair of congruent shapes,

  ..... and .....

- a pair of shapes that are similar but not congruent,

  ..... and .....

- another pair of shapes that are similar but not congruent.

  ..... and .....

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**5.** *You will be assessed on the quality of your written communication in this question.*

The total cost of 4 magazines is £3.60.
Each magazine costs the same amount.
How much do 17 magazines cost?
You must show all your working. [5]

.....

.....

.....

.....

.....

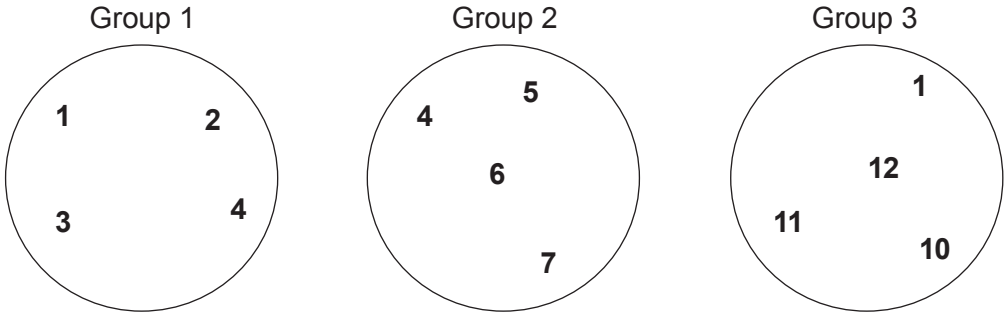
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**6.** *(a)* Here are three groups of numbers.




A number is moved from one of the groups to one of the other groups.
The sum of the numbers in each group is now the same.

Which number is moved to which group? [1]

.....

.....

The number ..... is moved from group ..... to group .....

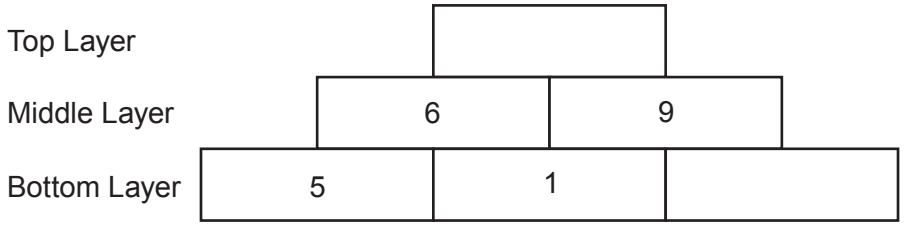
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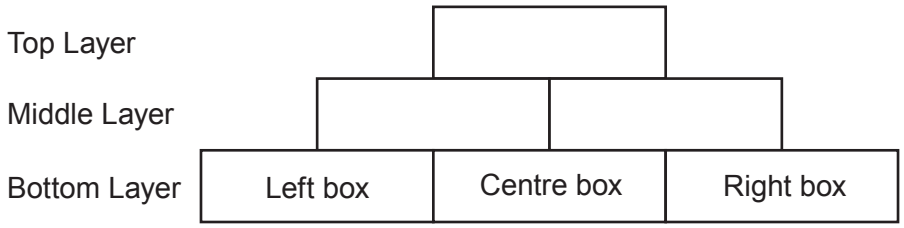
Examiner only

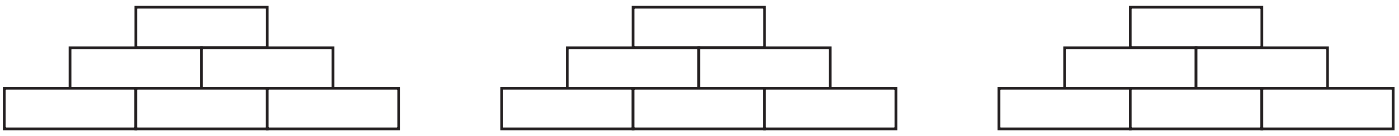
*(b)* To fill in a box in each layer of the following diagram, you must add the values in the two boxes directly below it.
For example, the 6 is found from 5 + 1 = 6 in the diagram below.

(i) Fill in the empty boxes. [2]




(ii) You start out with **three different numbers** in the bottom layer.
In order to get the greatest number on the top layer, in which of the three boxes in the bottom layer should the largest of the three starting numbers go?
You must show all your working.
You may wish to use the diagrams provided. [3]



.....

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.....

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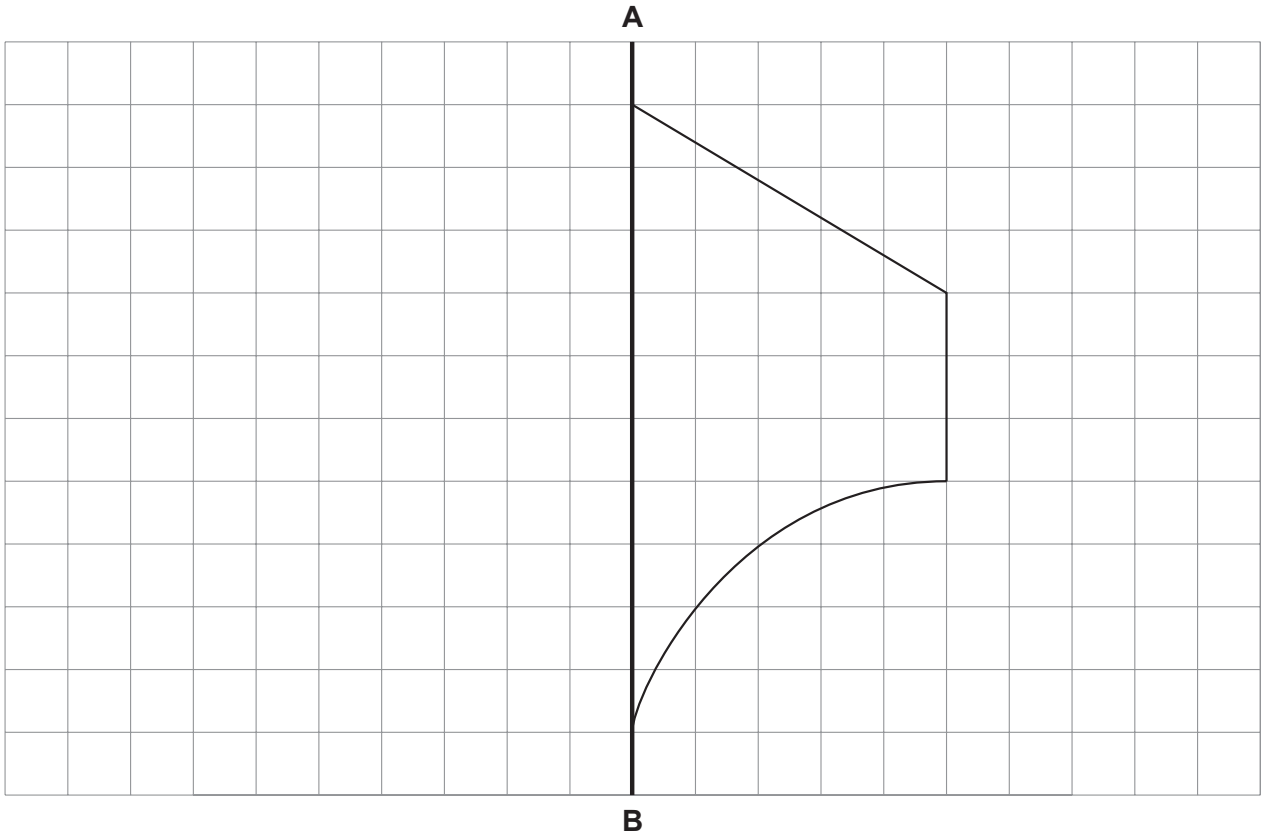
The largest number should be placed in the ..... box.

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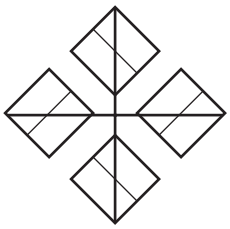

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**7.** *(a)* Complete the following diagram so that **AB** is a line of symmetry. [2]



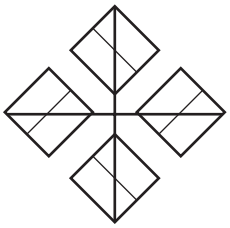

*(b)* (i) Write down the order of rotational symmetry of the shape below. [1]

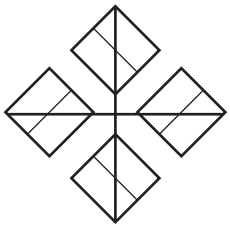


Order of rotational symmetry = .....

(ii) Parts of the shape above can be shaded so that the order of rotational symmetry remains the same as in the original shape.

Show two different ways to shade parts of the shape so that it still has the **same order of rotational symmetry**. [2]





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**8.** A shape is made up of five identical rectangles.
The area of the complete shape is 500 $m^2$.
The width of each rectangle is 4 m.
Calculate the length of one of the rectangles. [3]

.....

.....

.....

.....

.....

Length = ..... m



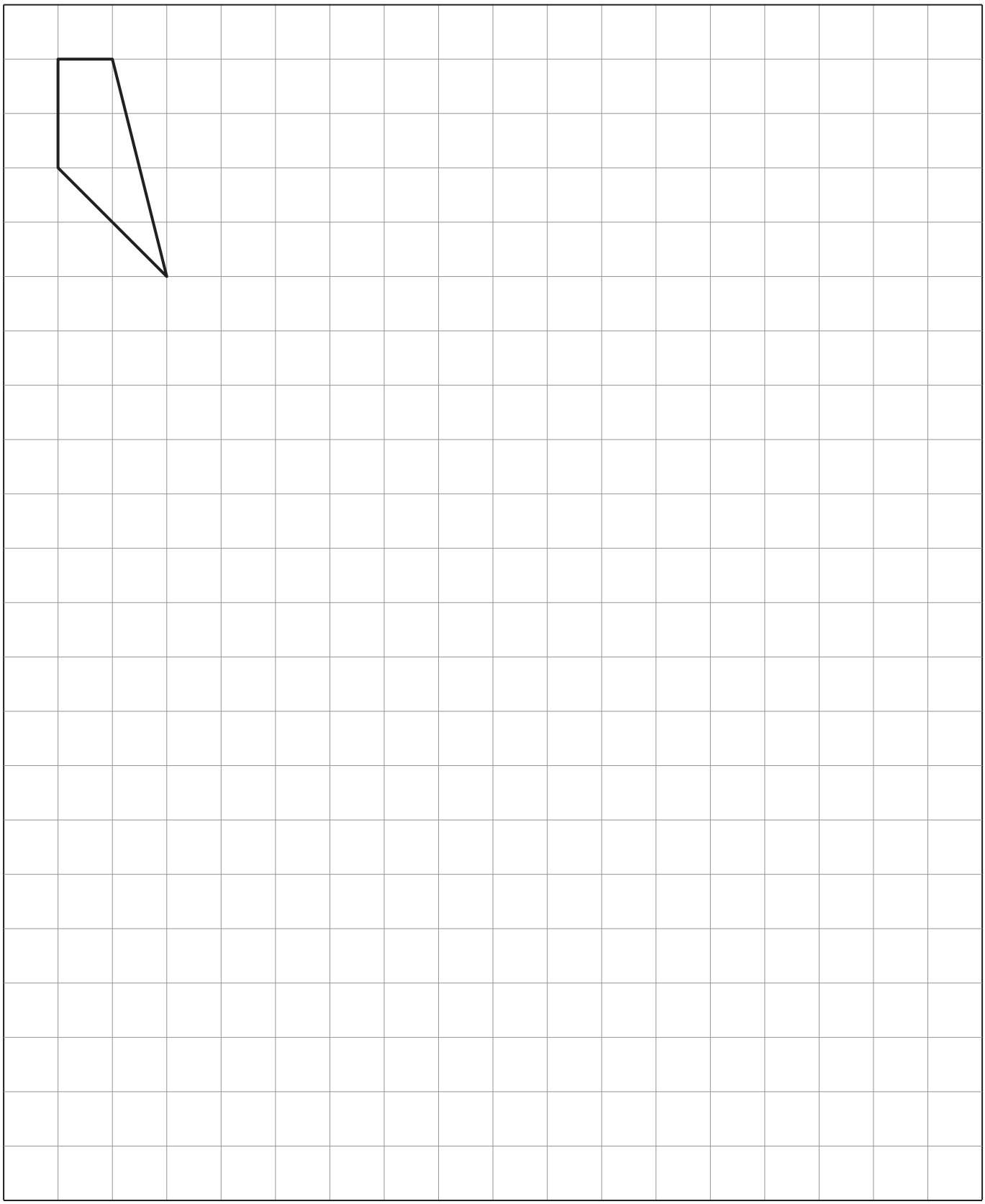
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**9.** Enlarge the following shape by a scale factor of 4. [2]



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**10.** *(a)* Find 2·7% of 54. Give your answer correct to 2 decimal places. [3]

*(b)* Find $\frac{2}{5}$ of 255. [2]

*(c)* 0·7 kg of apples and 0·9 kg of bananas together cost £1.56.
Apples cost £1.20 per kg.
How much do bananas cost per kg? [5]

*(d)* Which of the fractions $\frac{3}{10}$, $\frac{5}{20}$ or $\frac{17}{80}$ is nearest to $\frac{1}{5}$ ?

You must show all your working. [3]

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**11.** *(a)* Solve $x - 7 = 11$. [1]

*(b)* Solve $5x = 30$. [1]

*(c)* Solve $\frac{x+3}{2} = 16$ . [2]

*(d)* Solve $\frac{7}{x} = 28$ . [1]



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**12.** *(a)* Water flows into a cylindrical tank at a constant rate.

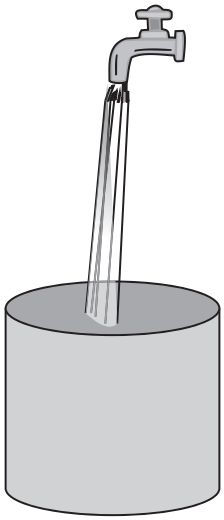


*Diagram not drawn to scale*

It took 36 minutes to fill the tank to a height of 40 cm.
How long did it take to fill to a height of 5 cm? [2]

.....

.....

.....

.....

*(b)* The volume of a cuboid is 2400 $cm^3$.
Its height is 100 cm.
The length of the rectangular base is **2 cm longer** than its width.

Calculate the length and width of the rectangular base of this cuboid. [3]

.....

.....

.....

.....

.....

.....

.....

Length is ..... cm

Width is ..... cm

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**Turn over.**

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Examiner only

**13.** A long roll of wire is to be cut in the ratio 5 : 6 : 7.



Once it has been cut, explain why you cannot have $\frac{4}{9}$ of the roll as a single piece of wire.
You must show all your working. [3]

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**14.** *(a)* Seven times a whole number, $x$, subtract twenty-six is greater than forty-four.
What is the least possible value of this whole number? [3]

*(b)* The diagram shows a shape formed by joining a triangle to a square.

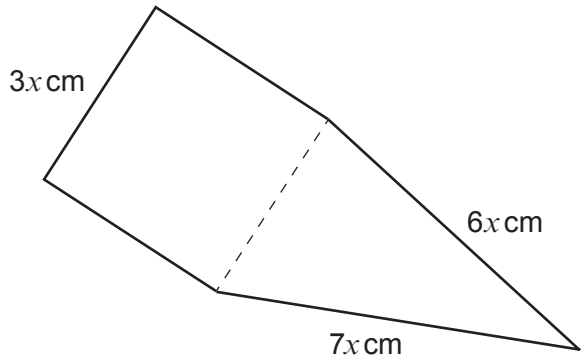



*Diagram not drawn to scale*

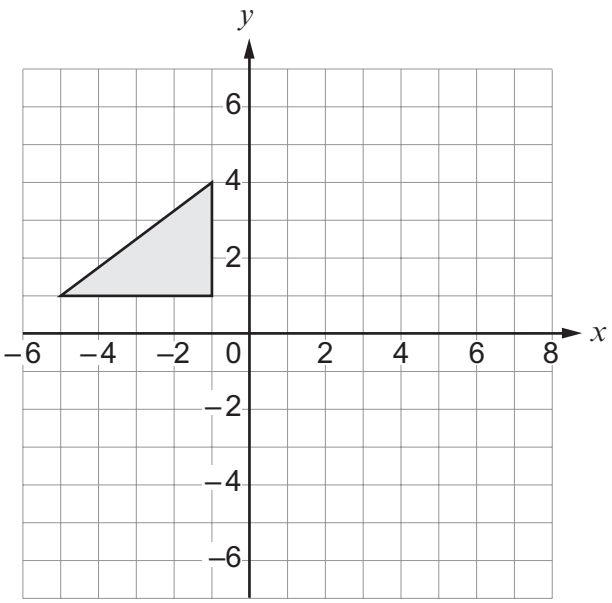
The perimeter of the shape is 1166 cm.

Write down an equation, in terms of $x$, for the perimeter of the shape.
Solve your equation and write down the length of one of the sides of the square. [4]

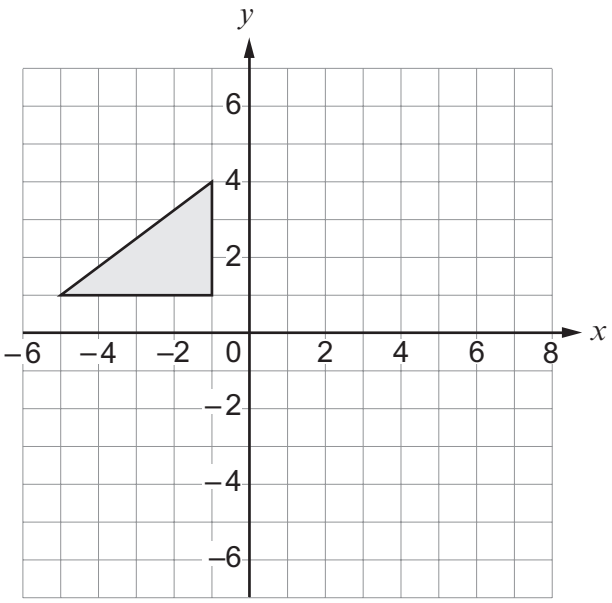
Length of a side of the square is ..... cm

Examiner only

**15.** *(a)* Reflect the triangle in the line $y = x$. [2]




*(b)* Translate the triangle shown below by $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$. [1]

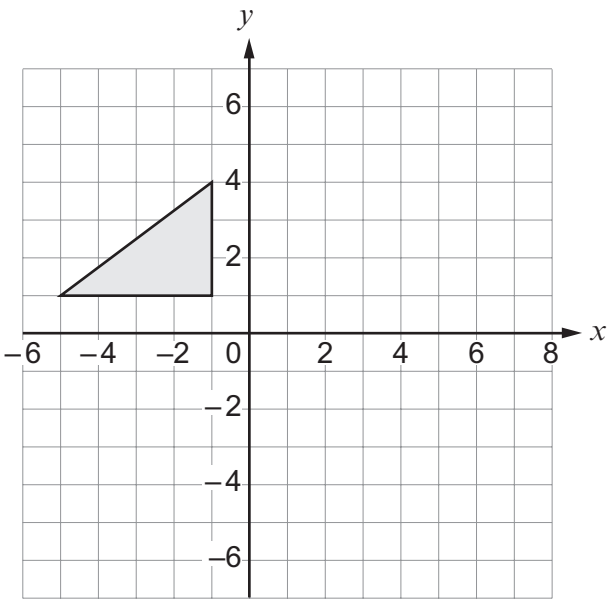



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*(c)* Rotate the triangle shown on the grid below through 90° clockwise about (0, –1). [2]




**16.**

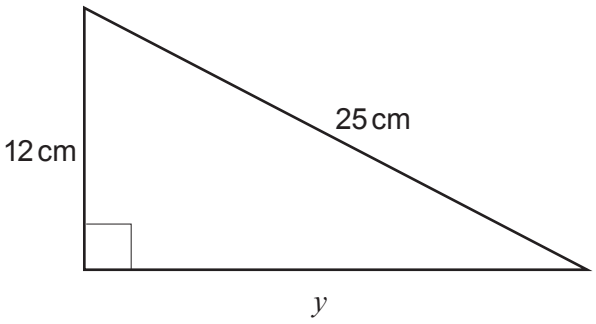



*Diagram not drawn to scale*

Calculate the length $y$. [3]

.....

.....

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**END OF PAPER**

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| Surname | Centre Number | Candidate Number |
|---|---|---|
| Other Names | | 0 |

# GCSE LINKED PAIR PILOT

4364/01

S15-4364-01

# METHODS IN MATHEMATICS

## UNIT 2: Methods (Calculator)
## FOUNDATION TIER

A.M. MONDAY, 8 June 2015

1 hour 30 minutes

| For Examiner's use only | | |
|---|---|---|
| **Question** | **Maximum Mark** | **Mark Awarded** |
| **1.** | **10** | |
| **2.** | **6** | |
| **3.** | **2** | |
| **4.** | **6** | |
| **5.** | **8** | |
| **6.** | **8** | |
| **7.** | **5** | |
| **8.** | **7** | |
| **9.** | **6** | |
| **10.** | **3** | |
| **11.** | **5** | |
| **12.** | **2** | |
| **13.** | **3** | |
| **14.** | **6** | |
| **15.** | **3** | |
| **Total** | **80** | |

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### ADDITIONAL MATERIALS

A calculator will be required for this paper.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take $\pi$ as 3·14 or use the $\pi$ button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **6**.

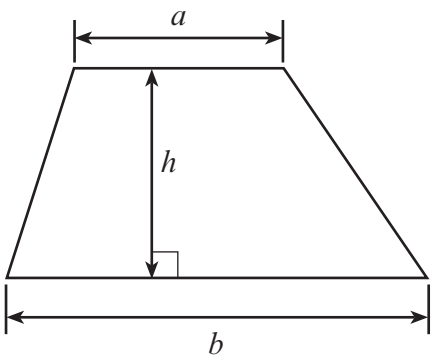
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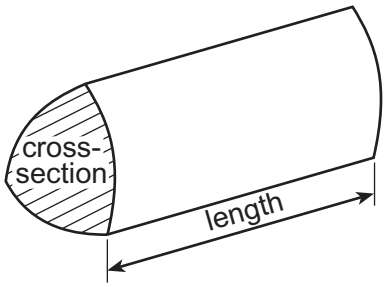
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## Formula List

**Area of trapezium** $= \frac{1}{2}(a + b)h$




**Volume of prism** = area of cross-section × length




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**1.** *(a)* (i) Write down the **smallest** four digit number that can be written using all the digits 5, 8, 2 and 1. [1]

| | | | |
|---|---|---|---|
| | | | |

(ii) Write down the **largest even** four digit number that can be written using all the digits 5, 8, 2 and 1. [1]

| | | | |
|---|---|---|---|
| | | | |

*(b)* In the following list, draw a circle around each number that has the same value as 0·1. [2]

**10%** **1%** $\frac{1}{100}$ $\frac{1}{10}$ **0.1%**

*(c)* (i) Write down the value of double fifteen thousand. [1]

.....

(ii) Write down the value of three quarters of a hundred. [1]

.....

*(d)* Circle the numbers that are divisible by 6. [2]

**9** **10** **11** **12** **13** **14**

**15** **16** **17** **18** **19**

**20** **21** **22** **23**

*(e)* Use either the symbol < or > to make each statement true. [2]

| | | |
|---|---|---|
| 8 | ..... | 3 |
| –2 | ..... | 9 |
| –10 | ..... | –20 |

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**2.** *(a)* Work out each of the following: [2]

$\frac{4+6}{2} \times 7 =$ .....

$\frac{50 \times 10}{5+15} =$ .....

*(b)* Using the cards below, fill in the blanks to make the calculations correct. Each card must be used only once. [4]

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | + | | | = | 4 | 2 | | |
| | | – | 5 | 3 | = | 4 | 3 | | |
| | | + | | | = | 1 | 0 | 0 | |
| | | × | 2 | 3 | = | 2 | 3 | 0 | |

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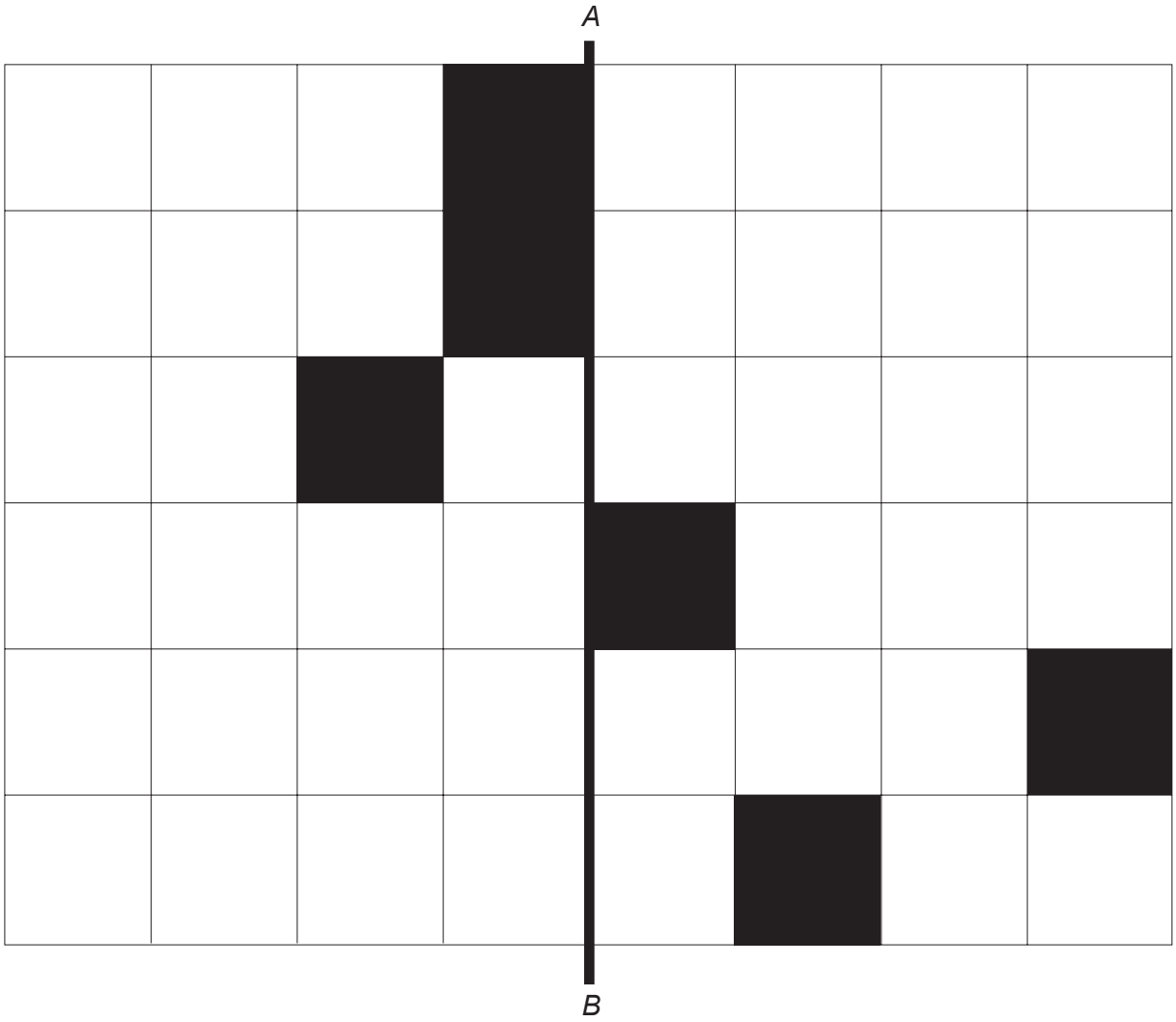
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**3.** Fill in the smallest number of squares in order to make the following diagram symmetrical about the line *AB*. [2]




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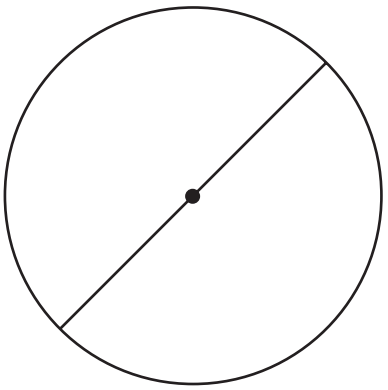
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**Turn over.**

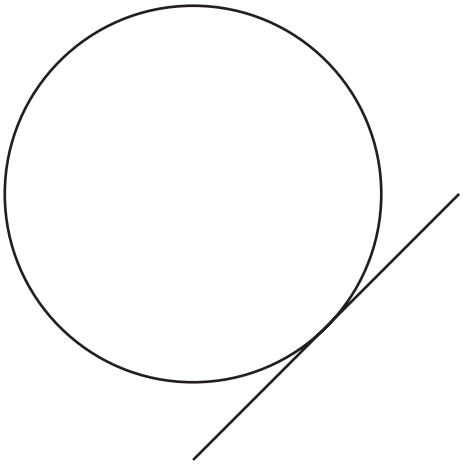
Examiner only

**4.** *(a)* Select the special name for the straight line shown in each of the following diagrams. Write your answer in the space by each diagram. [3]

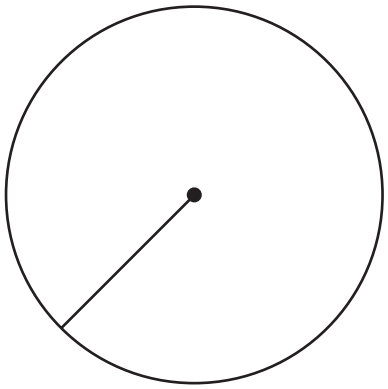
**radius** **chord** **diameter** **tangent** **circumference**



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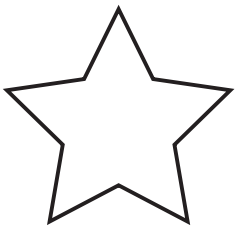
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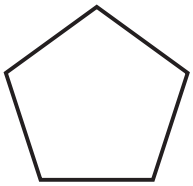
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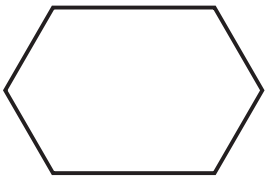
*(b)*



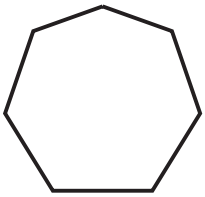
A



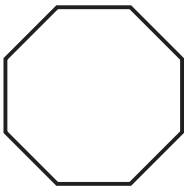
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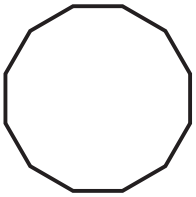
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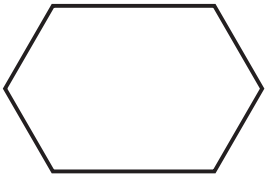
D



E



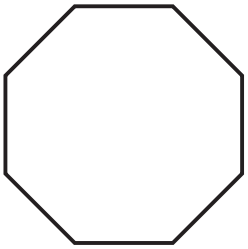
F



G



H



I

Use the diagrams above to identify and write down: [3]

- a pair of congruent shapes,

.....

- a pair of shapes that are similar but not congruent,

.....

- another pair of shapes that are similar but not congruent.

.....

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**5.** A shape is made from two identical rectangles each measuring 10 cm by 2 cm and two identical rectangles each measuring 8 cm by 2 cm.
They connect to enclose a shaded region, as shown in the diagram below.

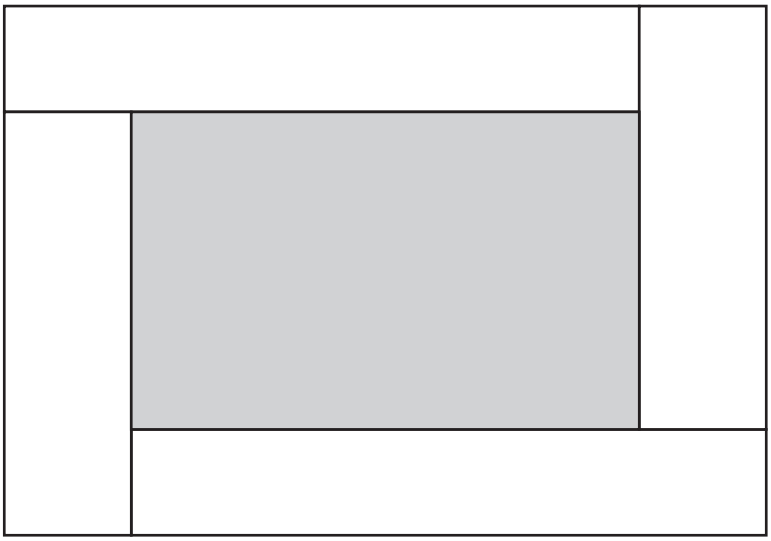


*Diagram not drawn to scale*

*(a)* How many lines of symmetry are there in the shape? [1]

.....

*(b)* What is the order of rotational symmetry of the shape? [1]

.....

*(c)* Calculate the outer perimeter of the shape. [2]

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*(d)* Calculate the area of the **shaded** region. You must show the units of your answer. [4]

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**6.** *You will be assessed on the quality of your written communication in this question.*



Small pot of daffodils

£1.20



Large pot of daffodils

Marjorie spent £20 on daffodils and received 50p change.
She bought 10 small pots of daffodils.
The large pots of daffodils were 25% more expensive than the small pots of daffodils.
How many large pots of daffodils did she buy?
You must show all your working. [8]

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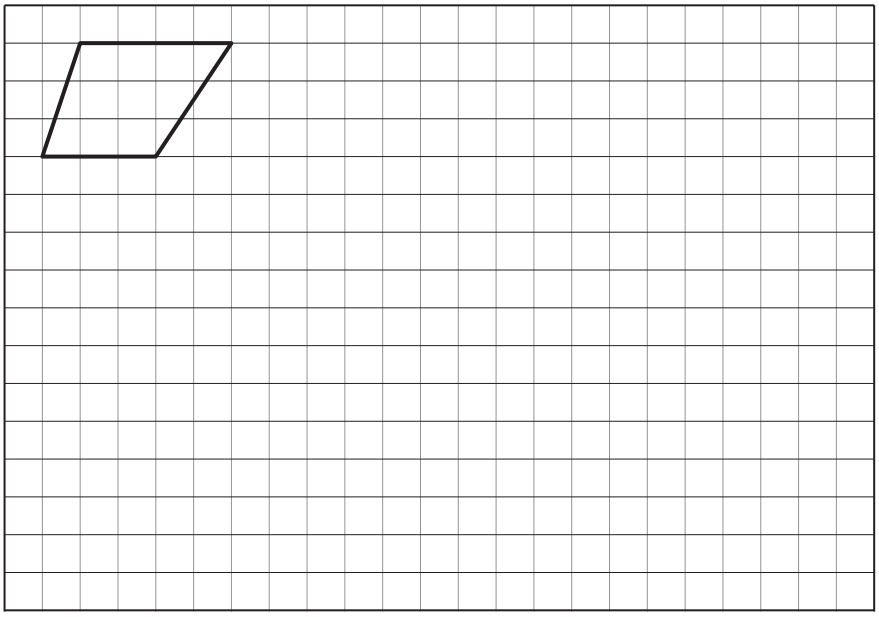
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**7.** *(a)* Enlarge the following shape by a scale factor of 3. [2]



*(b)* The volume of a large cube is 216 cm$^3$.
It is made up of smaller cubes measuring 2 cm by 2 cm by 2 cm.

How many of the smaller cubes are used to make the large cube? [3]

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**8.** *(a)* Find the value of $53 \cdot 2^3 + \sqrt{9671 \cdot 3}$. Write your answer correct to 2 significant figures. [2]

.....

.....

*(b)* Find the value of $\frac{2}{0 \cdot 6^2}$. Write your answer correct to 1 decimal place. [2]

.....

.....

*(c)* Which of the fractions $\frac{3}{8}$, $\frac{5}{16}$ or $\frac{9}{64}$ is nearest to $\frac{1}{4}$?

You must show all your working. [3]

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**9.** *(a)* Solve $a - 9 = 17$. [1]

*(b)* Solve $\frac{x}{8} = 16$. [1]

*(c)* Solve $3y + 14 = 41$. [2]

*(d)* Solve the inequality $2x + 3 > 35$. [2]



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**10.**



A pen costs $4x$ pence.
A pencil costs $2 + 3x$ pence.

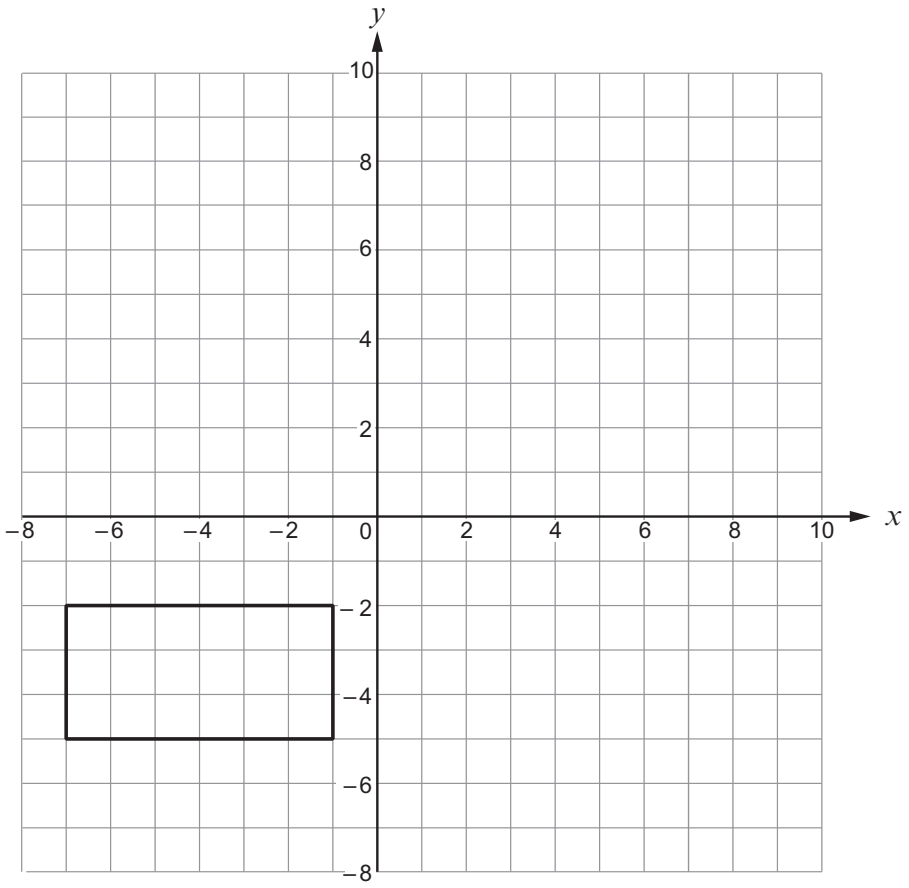
The total cost of a pen and a pencil is 65 pence.
Write an equation in $x$ and solve it to find the value of $x$. [3]



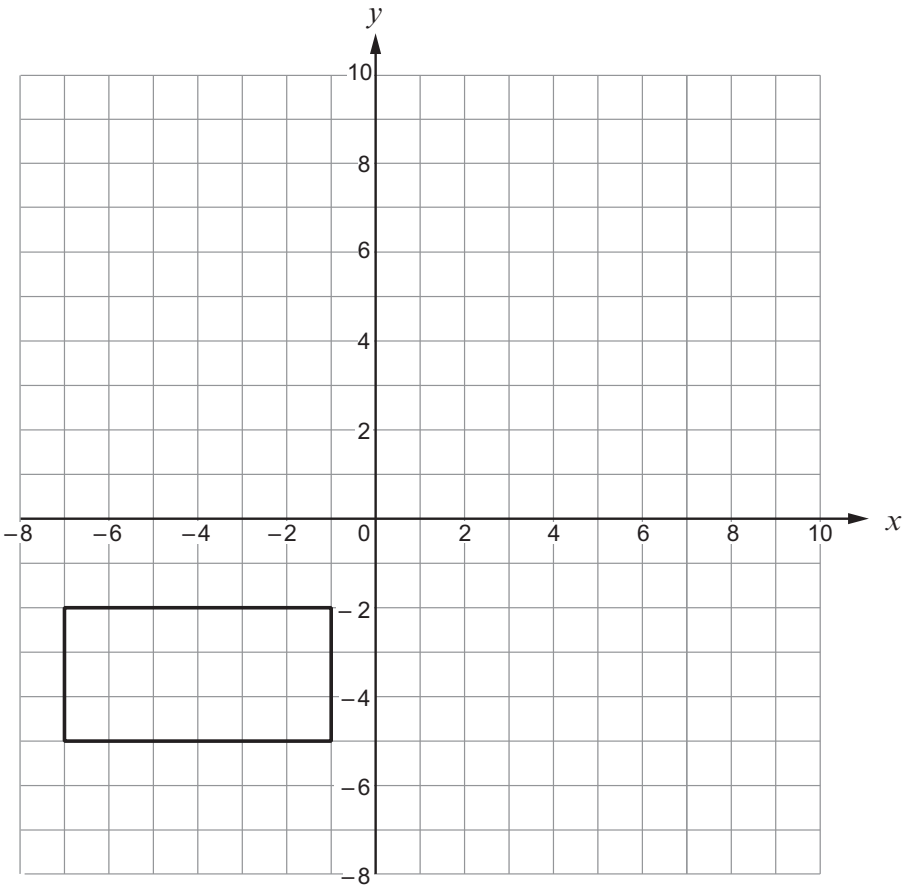
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**11.** *(a)* Reflect the rectangle shown below in the line $x = 1$. [2]

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*(b)* Translate the rectangle shown below by $\begin{pmatrix} 8 \\ 5 \end{pmatrix}$. [1]



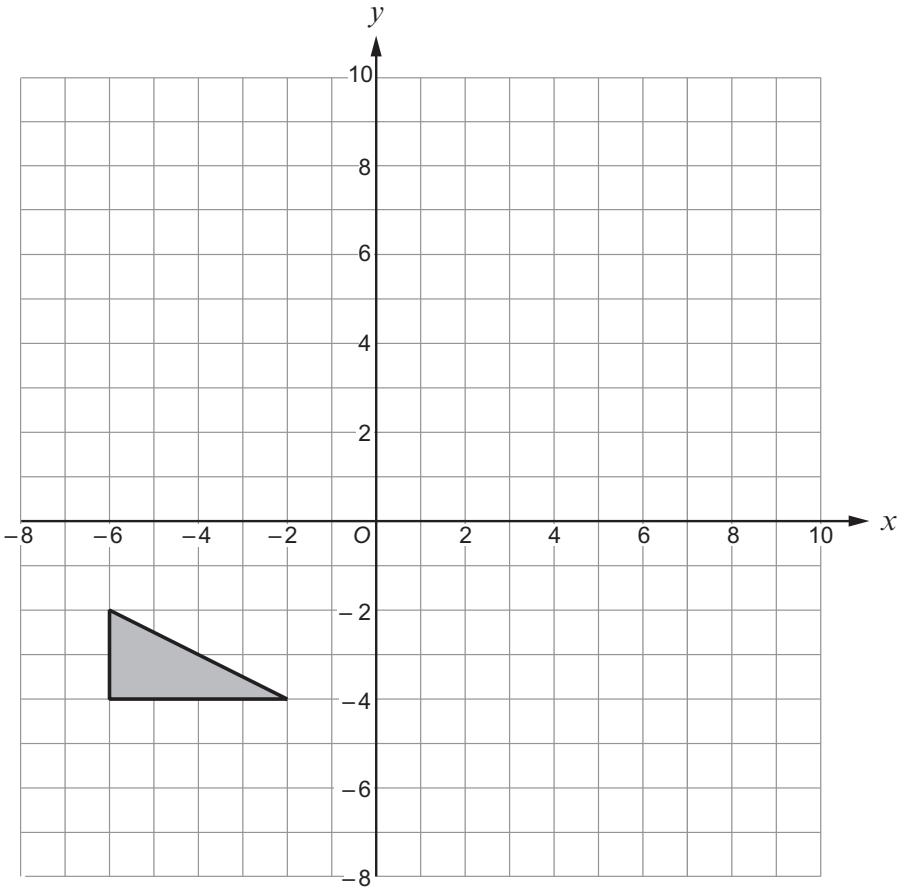

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*(c)* Rotate the triangle through 90° anticlockwise about *O*. [2]




**12.**

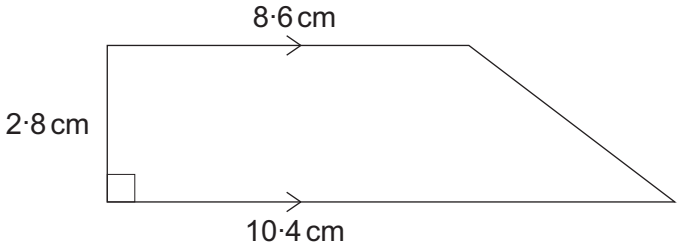



*Diagram not drawn to scale*

Calculate the area of the trapezium. [2]

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**13.** Agnes and Bryn both buy identical pizzas to share with friends.



Agnes gives Carwyn $\frac{2}{5}$ of her pizza.

Bryn shares his pizza in the ratio 1 : 2 : 3 : 4 and gives Dafydd the largest piece.

Does Carwyn have:

- the same size piece of pizza as Dafydd, or
- a larger piece of pizza than Dafydd, or
- a smaller piece of pizza than Dafydd?

You must explain your answer and show all your working. [3]

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**14.** The shape below shows a semi circle attached to a rectangle.

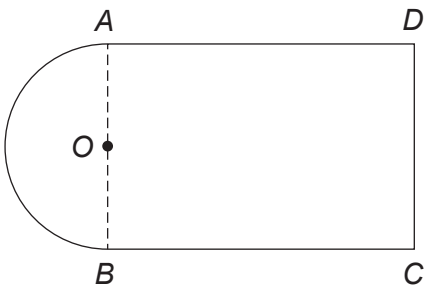



*Diagram not drawn to scale*

The radius of the semi circle is 6·1 cm and the length $BC$ = 16·7 cm.
Calculate the area of the shape. [6]

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**15.**

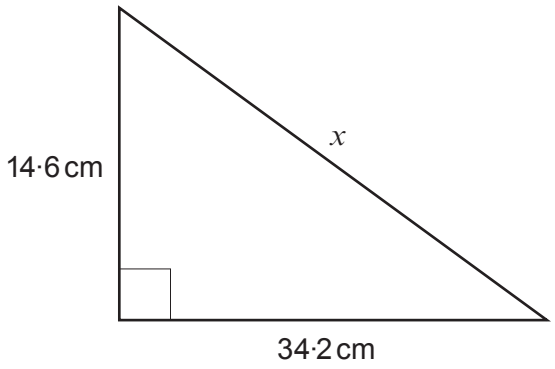



*Diagram not drawn to scale*

Calculate the length $x$. [3]

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**END OF PAPER**

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| Surname | Centre Number | Candidate Number |
|---|---|---|
| Other Names | | 0 |

# GCSE LINKED PAIR PILOT

4364/01

W15-4364-01

# METHODS IN MATHEMATICS

## UNIT 2: Methods (Calculator)
## FOUNDATION TIER

A.M. MONDAY, 19 January 2015

1 hour 30 minutes

| For Examiner's use only | | |
|---|---|---|
| **Question** | **Maximum Mark** | **Mark Awarded** |
| **1.** | **6** | |
| **2.** | **9** | |
| **3.** | **2** | |
| **4.** | **6** | |
| **5.** | **5** | |
| **6.** | **7** | |
| **7.** | **8** | |
| **8.** | **7** | |
| **9.** | **2** | |
| **10.** | **4** | |
| **11.** | **3** | |
| **12.** | **8** | |
| **13.** | **4** | |
| **14.** | **4** | |
| **15.** | **5** | |
| **Total** | **80** | |

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### ADDITIONAL MATERIALS

A calculator will be required for this paper.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take $\pi$ as 3·14 or use the $\pi$ button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **7**.

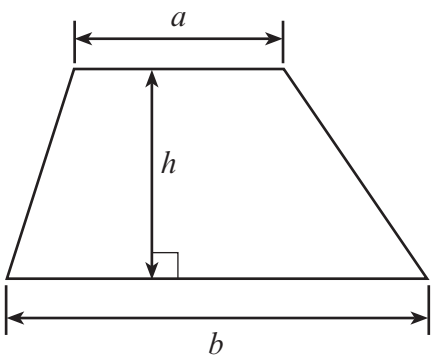
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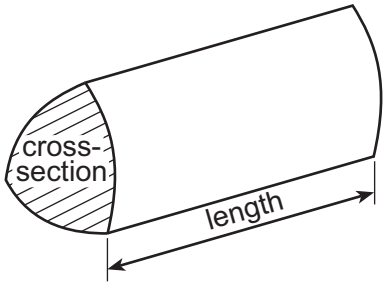
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## Formula List

**Area of trapezium** $= \frac{1}{2}(a + b)h$




**Volume of prism** = area of cross-section × length

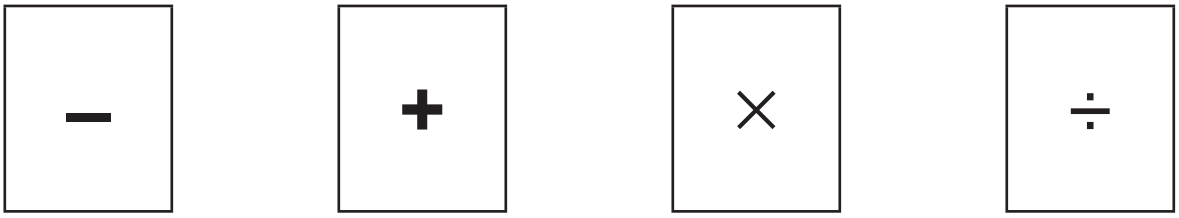



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**1.** Using the signs below, fill in the missing blanks. [6]




$$23 \;\square\; 17 = 40$$

$$100 \;\square\; 25 = 75$$

$$36 \;\square\; 3 = 12$$

$$4 \;\square\; 4 = 16$$

$$2 \;\square\; 5 \;\square\; 3 = 13$$

$$10 \;\square\; 2 \;\square\; 5 = 0$$

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**2.** *(a)* (i) Write down the **smallest** four-digit number that can be made using all the digits 9, 7, 4 and 6. [1]

.....

(ii) Write down the **largest odd** four-digit number that can be made using all the digits 9, 7, 4 and 6. [1]

.....

*(b)* Circle **three** of the following that have the same value as $\frac{2}{10}$. [3]

**20%** **0·002** **0·02** **5**

**0·2** **2%** $\frac{1}{5}$

*(c)* (i) Write down the value of double two hundred thousand. [1]

.....

(ii) Write down the value of a quarter of a thousand. [1]

.....

*(d)* Circle the numbers that are divisible by **both** 3 **and** 4. [2]

**10** **11** **12** **13** **14** **15**

**16** **17** **18** **19** **20**

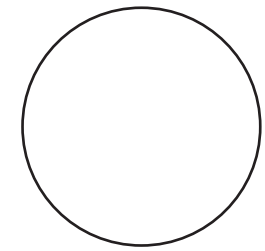
**21** **22** **23** **24**

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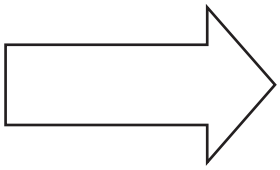
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**3.**



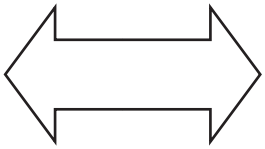
**A**



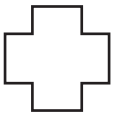
**B**



**C**



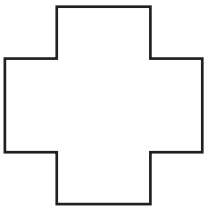
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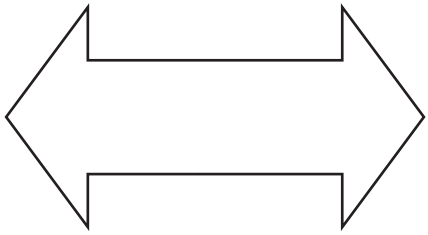
**E**



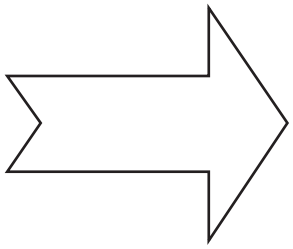
**F**



**G**



**H**



**I**

Use the diagrams above to identify and write down [2]

- a pair of similar shapes

.....

- another pair of shapes that are similar.

.....

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**4.** *(a)* 20 pencils cost £3.60.
How much do 4 pencils cost? [4]

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*(b)* Find 53% of 4·2. [2]

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**5.** *(a)* Calculate the area of the following rectangle. [2]

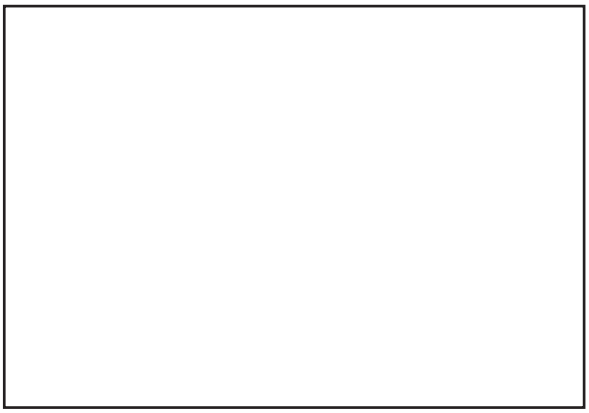



*Diagram not drawn to scale*

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*(b)* The perimeter of another rectangle is 36 cm.
The length of the rectangle is twice as long as its width.
Calculate the length and width of the rectangle. [3]

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Length = ..... cm Width = ..... cm

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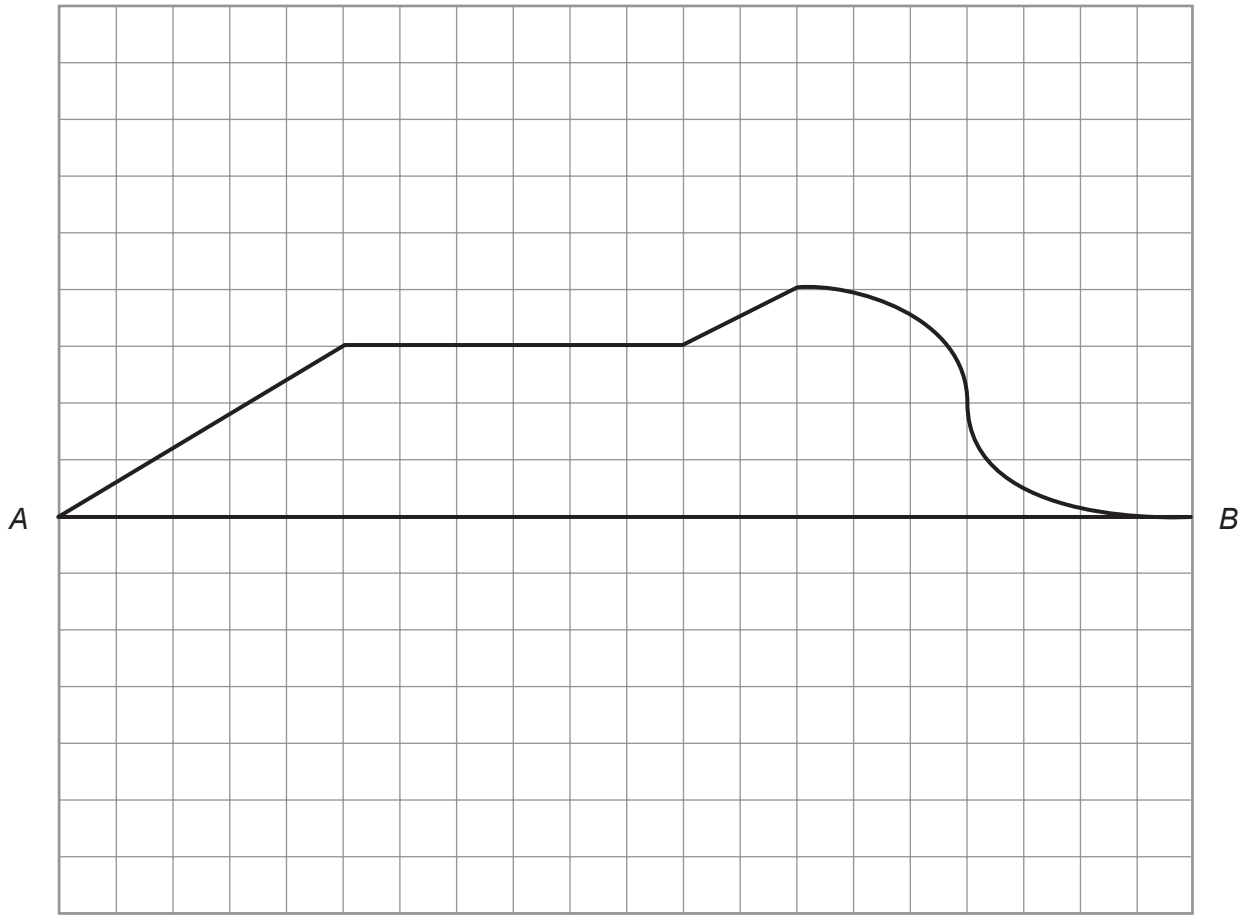
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**6.** *(a)* Complete the following diagram so that *AB* is a line of symmetry. [2]




*(b)* Write down the order of rotational symmetry of the shapes below. [2]



Order of rotational symmetry = .....



Order of rotational symmetry = .....

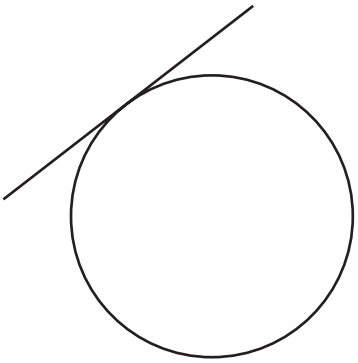
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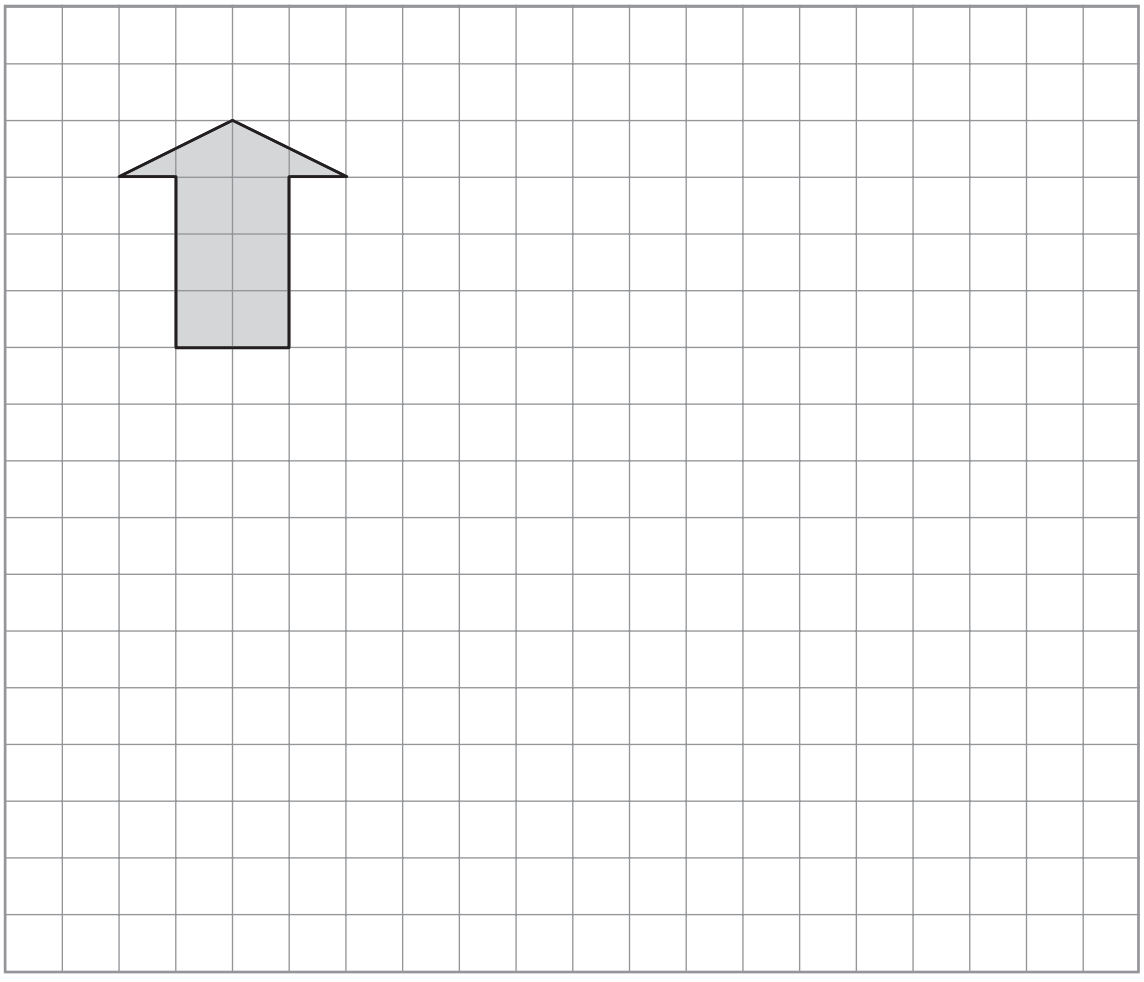
*(c)* Select the special name for the straight line shown in the following diagram. [1]

**radius** **chord** **diameter** **tangent** **circumference**



.....

*(d)* Enlarge the following shape by a scale factor of 2. [2]



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**Turn over.**

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**7.** *You will be assessed on the quality of your written communication in this question.*

Three friends Alwen, Brian and Ceri bought a bunch of flowers, a box of chocolates and a bottle of perfume for their teacher.

Alwen bought the flowers which cost £12.45.
Brian bought the chocolates which cost £3.90.
Ceri bought the bottle of perfume which cost £24.60.

They decide to share the bill equally.

- Calculate how much money each friend should pay.
- Who owes how much, and to whom?

You must show all your working. [8]

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**8.** *(a)* Solve $\frac{x}{7} = 7$. [1]

.....

.....

*(b)* Solve $5y - 6 = 49$. [2]

.....

.....

*(c)* (i) Find the values of $x$ and $y$ when $4x = 20$ and $x + y = 4$. [2]

.....

.....

(ii) Use your answers to find the value of $2x + 3y$. [2]

.....

.....

**9.** Find the value of $5{\cdot}12^3 - \sqrt{425{\cdot}1}$. Write down your answer to 1 decimal place. [2]

.....

.....

**10.** Use the following clues to find the missing **whole** number.

- The number is between 80 and 100.
- The number is less than $\frac{1}{3}$ of 282.
- The number is greater than 20% of 450.
- The number is not odd. [4]

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The missing whole number is .....

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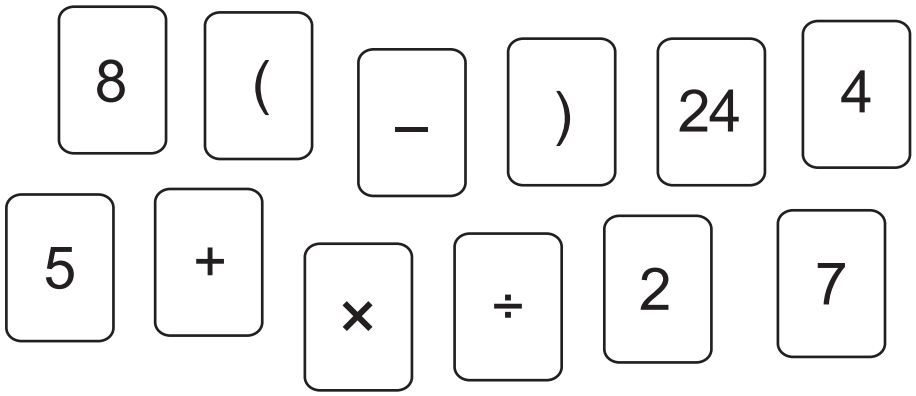


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**11.**

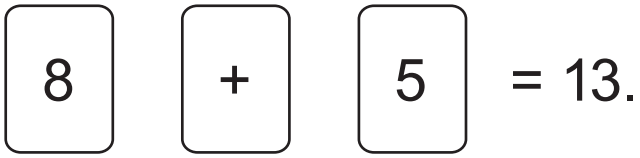



Use only cards from the selection shown above to create calculations with answers of 60, –7 and 21.

Remember:

- there are no other cards available to use
- a card may be used once only in each calculation
- a complete selection of these cards is available for each calculation. [3]

For example, to create a calculation with the answer 13,




*(a)* = 60

*(b)* = –7

*(c)* = 21

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**12.** *(a)* The volume of a cuboid is 385 $cm^3$.
The height of the cuboid is 11 cm.
The length and the width of the cuboid are both whole numbers of centimetres.
Calculate a possible length and width of this cuboid.
You must show all your working. [3]

*(b)*

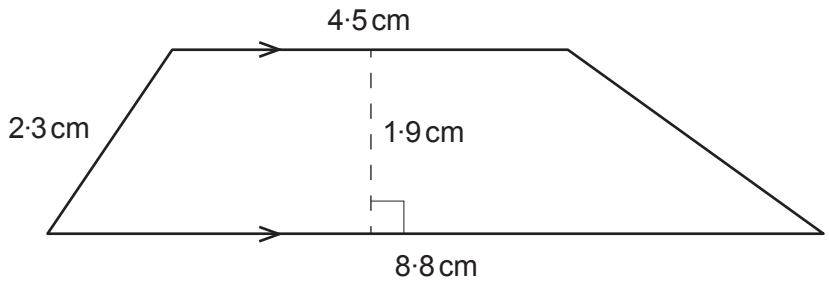



*Diagram not drawn to scale*

Calculate the area of the trapezium shown above, giving the units for your answer. [3]

*(c)* Calculate the area of a circle with radius 8 cm. [2]


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**13.** *(a)* Solve $\frac{x+17}{3} = 5$. [2]

.....

.....

.....

.....

*(b)* Solve the inequality $5x - 22 < 188$. [2]

.....

.....

.....

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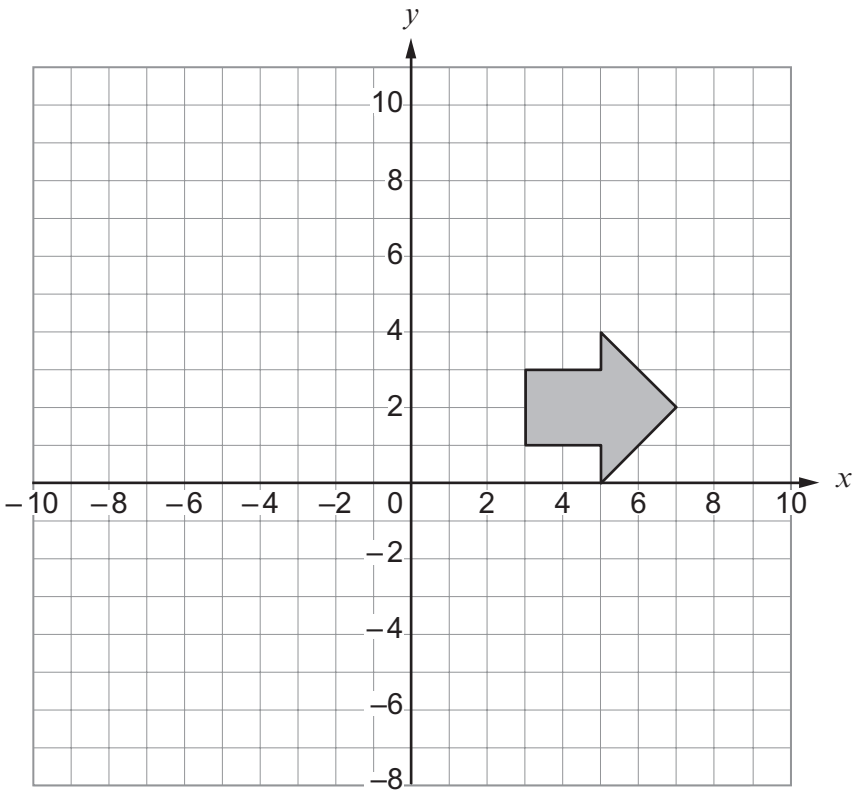
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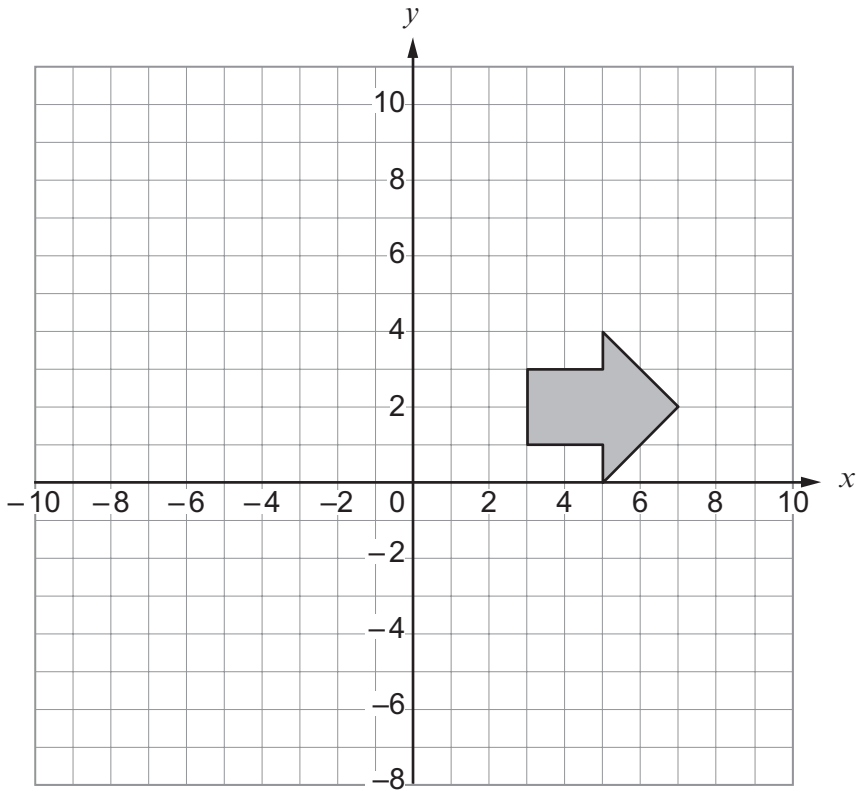
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**14.** *(a)* Reflect the shape in the $x$-axis. [2]




*(b)* Rotate the shape through 90° anticlockwise about the point (1, –1). [2]




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**Turn over for Question 15**

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**15.** Calculate the lengths $p$ and $q$ in the right-angled triangles shown below. [5]

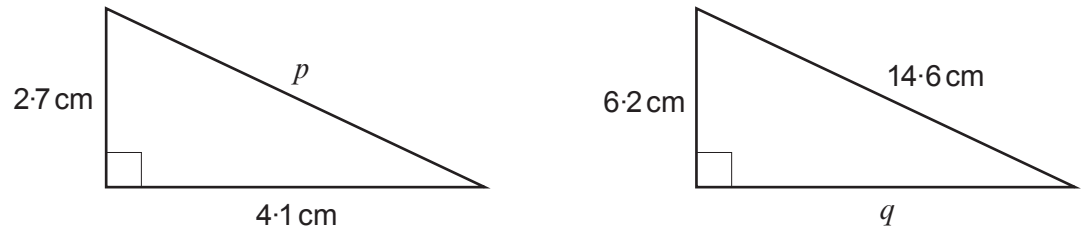



*Diagram not drawn to scale*

**END OF PAPER**

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# GCSE MARKING SCHEME

## METHODS IN MATHEMATICS (LINKED PAIR PILOT)

## JANUARY 2015

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## INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2015 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.


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| Unit 2 Higher Tier | 14 |


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# METHODS UNIT 2
# FOUNDATION TIER

| Methods Unit 2 Foundation Tier<br>January 2015 | Mark | Comment |
|---|---|---|
| 1. +<br>–<br>÷<br>×<br>× +<br>÷ – **or** – × | B1<br>B1<br>B1<br>B1<br>B1<br>B1<br><br>6 | |
| 2. (a) (i) 4679<br>(ii) 9647<br>(b) 20%, 0.2, 1/5 indicated<br><br><br><br>(c) (i) 400 000 or four hundred thousand<br>(ii) 250 or two hundred and fifty<br>(d) 12 and 24 indicated | B1<br>B1<br>B3<br><br><br><br>B1<br>B1<br>B2<br><br>9 | <br><br>B2 for 3 correct and 1 incorrect<br>B2 for 2 correct and no more than 1 incorrect<br>B1 for 1 correct and no more than 2 incorrect<br>B1 for 2 or 3 correct and 2 incorrect<br><br><br>B1 for 2 correct and 1 incorrect<br>OR 1 correct and no more than 1 incorrect |
| 3. D and H<br>E and G | B1<br>B1<br><br>2 | |
| 4. (a) (£)3.60 ÷ 20<br>(£)0.18 or 18(p)<br>(£)0.18 × 4 or 18 × 4<br>(£) 0.72 or 72 (p)<br><br><br><br><br><br><br><br>(b) 53/100 × 4.2 or equivalent<br>2.226 | M1<br>A1<br>m1<br>A1<br><br><br><br><br><br><br><br>M1<br>A1<br><br>6 | OR 1 correct step, e.g. 10 pens cost (£)1.80<br><br>FT their 0.18 or 18 if M1 awarded<br>Do not accept £72 or 0.72p<br><br>Award SC1 for sight of (5.5 × 4 =) 22(p)<br>or 5.55… × 4 = 22.22… following 20 ÷ 3.60<br><br>*Alternative solution:*<br>*20 ÷ 4 = 5* *M1*<br>*(£)3.60 ÷ 5* *M1*<br>*= (£)0.72 OR 72(p)* *A2*<br>*For incorrect units, award A1 only*<br>*e.g. 0.72p or £72*<br><br>Accept 2.2 or 2.23 if the correct answer is seen.<br>Otherwise, award SC1 for unsupported an answer of 2.2 or 2.23. |
| 5. (a) 13 × 9<br>117 ($cm^2$)<br><br>(b) Attempting to add two pairs of numbers to make 36 or any two numbers that add to 18<br><br>Attempting to add two numbers (or two pairs of numbers) with one being double the other<br><br>Length = 12, Width = 6 | M1<br>A1<br><br>M1<br><br><br>M1<br><br><br>A1<br><br>5 | <br><br><br>Numbers must be less than 18<br><br><br>Numbers must be less than 18<br><br><br>CAO (Allow Length = 6, Width = 12) |

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| Methods Unit 2 Foundation Tier<br>January 2015 | Mark | Comment |
|---|---|---|
| 6. (a) Correct Diagram | B2 | B1 for lines, B1 for curvature of the curve |
| (b) 4 | B1 | |
| 2 | B1 | |
| (c) Tangent | B1 | |
| (d) Enlargement of scale factor 2 | B2 | B1 for any two lines correct or 3 points correct<br>B1 for correct enlargement using different scale factor or B1 for a 'nearly correct' enlargement using scale factor 2 |
| | 7 | |
| 7. (Total cost =) (12.45 + 3.9(0) + 24.6(0)) ÷ 3 | M1 | Or dividing each individual price by 3 |
| (Each person pays £) 13.65 | A1 | Or (£)4.15, (£)1.3(0), (£)8.2(0) |
| Any one correct first step / strategy | S1 | E.g. (Ceri overspent £)24.6(0) – (£)13.65<br>FT 'their (£)13.65, (£)4.15, (£)1.3(0), (£)8.2(0)' |
| Any TWO of: Ceri overspent (£)10.95<br>Alwen underspent (£)1.20<br>Brian underspent (£)9.75 | B1 | OR Brian and Ceri owe Alwen (£)4.15 each AND<br>Alwen and Ceri owe Brian (£)1.30 each AND<br>Brian and Alwen owe Ceri (£)8.20 each |
| Conclusion: Alwen owes Ceri (£)1.20 AND<br>Brian owes Ceri (£)9.75 | B2 | OR Brian owes Alwen (£)2.85 AND<br>Alwen owes Ceri (£)4.05 AND<br>Brian owes Ceri (£)6.90<br><br>Award B1 for either answer correct<br>OR all THREE of: Ceri overspent (£)10.95<br>Alwen underspent (£)1.20<br>Brian underspent (£)9.75<br><br>***Awarding last B2 or B1 implies all previous marks***<br><br>Award SC2 instead of the last 4 marks for a complete solution with correct values but names reversed and award SC1 for a similar solution with no more than one arithmetical error.<br>Award SC1 instead of the last 4 marks for a correct conclusion with final values given correct to the nearest pound, e.g. Alwen owes Ceri £1 and Brian owes Ceri £10. |
| Look for:<br>• accuracy of spelling<br>• clarity of labels<br>• correct units (£)<br>• the use of notation (watch for the use of '=', '–' and '÷' being appropriate)<br><br>QWC2: Candidates will be expected to<br>• present relevant work clearly, with words explaining process or steps<br>AND<br>• make few if any mistakes in spelling, punctuation and grammar<br><br>QWC1: Candidates will be expected to<br>• present work clearly which is mostly relevant, with words explaining process or steps<br>OR<br>• make few if any mistakes in spelling, punctuation and grammar and include units in their final answer | QWC 2 | QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| | 8 | |

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| Methods Unit 2 Foundation Tier<br>January 2015 | Mark | Comment |
|---|---|---|
| 8.<br>(a) 49<br><br>(b) $5y = 55$<br>$y = 11$<br><br>(c) (i) $x = 5$<br>$y = -1$<br><br>(ii) $(2 \times 5) + (3 \times -1)$<br>7 | <br>B1<br><br>B1<br>B1<br><br>B1<br>B1<br><br>B1<br>B1<br><br>7 | Accept embedded answers in (a), (b) and (c)(i).<br><br>FT one error<br><br><br>ISW<br>FT 'their $x$', i.e. $y = 4 -$ 'their $x$'<br><br>FT 'their $x$' and 'their $y$' for B1,<br>and for B2 provided $y < 0$ |
| 9. 113.6 | B2<br><br>2 | B1 for 113(.5997747…) OR<br>B1 for 134.2(…) – 20.6(…) |
| 10. 282/3 or 450 × 20/100<br>94<br>90<br>Missing number 92 | M1<br>A1<br>A1<br>A1<br><br>4 | |
| 11.<br>Examples:<br>(a) (8 + 4) × 5 or 7 × 8 + 4 or 5 × 8 + 24 – 4 (= 60)<br><br>(b) 24 ÷ 4 – (8 + 5) or 2 – (5 + 4) or (5 + 2) ÷ 7 – 8 (= -7)<br><br>(c) 7 × (5 – 2) or 7 × (8 – 5) or 24 + 2 – 5 (= 21) | <br><br>B1<br><br>B1<br><br>B1<br><br>3 | **Accept equivalent correct responses using ONLY the cards given, not repeats within a single calculation**<br>Brackets must be used correctly<br><br>Accept -24 ÷ 2 + 5 or 24 ÷ -2 + 5 |
| 12. (a) … × … × 11 = 385 or 385 ÷ 11<br>Attempt to find two whole numbers to multiply to 35<br>7(cm) and 5(cm) OR 35(cm) and 1(cm)<br><br>(b) ½ (4.5 + 8.8) × 1.9<br>12.6(35)<br>$cm^2$<br><br>(c) $\pi \times 8^2$<br>201.(06….$cm^2$) | S1<br>M1<br><br>A1<br><br>M1<br>A1<br>U1<br><br>M1<br>A1<br><br>8 | Idea towards area of the base<br><br><br>Correct answers awarded all 3 marks.<br><br><br><br>Independent mark<br><br>Accept 200.9(6) to 201.143 |
| 13.<br>(a) $x + 17 = 5 \times 3$<br>$x = -2$<br><br>(b) $5x < 22 + 188$<br><br><br>$x < 42$ | <br>M1<br>A1<br><br>M1<br><br><br>A1<br><br><br><br>4 | Accept embedded answer in (a)<br>Or $x/3 = 5 - 17/3$<br><br><br>No marks for '=' unless finally replaced to give $x < 42$, then award M1, A1.<br>An answer of $x < 210/5$ gets M1, A0<br>CAO<br>If no marks, award SC1 for $5x < 166$ ($x < 166/5$) with an answer $x < 33.2$, or for $5x < 200$ with an answer $x < 40$ |

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| Methods Unit 2 Foundation Tier<br>January 2015 | Mark | Comment |
|---|---|---|
| 14.(a) Correct reflection | B2 | B1 for reflection in the *y*-axis OR<br>B1 for 4 of the vertices reflected correctly |
| (b) Correct rotation | B2 | B1 for clockwise 90° rotation about (1, -1) OR<br>B1 for anticlockwise 90° rotation about (-1, 1) |
| | 4 | |
| 15. $(p^2 =)\ 2.7^2 + 4.1^2$ | M1 | Correct statement |
| $p^2 = 24.1$ or $p = \sqrt{24.1}$ | A1 | Power 2 or intention to take square root must be shown |
| $(q^2 =)\ 14.6^2 - 6.2^2$ or $14.6^2 = q^2 + 6.2^2$ | M1 | Correct statement |
| $q^2 = 174.72$ or $q = \sqrt{174.72}$ | A1 | Power 2 or intention to take square root must be shown |
| $(p =)$ 4.9(09175…cm) AND $(q =)$ 13.2(18..cm) | A1 | Accept rounded or truncated from correct working<br>*Alternative method using trigonometry:*<br>*M1 complete method to obtain an expression involving p, e.g. angle = $\tan^{-1}(2.7/4.1)$ AND sin(angle) = 2.7/p*<br>*A1 expression with p as subject: e.g. p = 2.7/sin(angle)*<br>*M1 complete method to obtain expression involving q, e.g. angle = $\sin^{-1}(6.2/14.6)$ AND cos(angle) = q/14.6*<br>*A1 expression with q as subject: e.g. q = 14.6cos(angle)* |
| | 5 | |

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# METHODS UNIT 2
# HIGHER TIER

| Methods Unit 2 Higher Tier<br>January 2015 | Mark | Comment |
|---|---|---|
| 1.(a) $100 \times 249.6/960$<br>26(%) | M1<br>A1 | |
| (b) 0.061 or $6.1 \times 10^{-2}$ | B1 | |
| (c) $9.6 - \frac{5}{16} \times 88$ or $9.6 - 27.5$<br>- 17.9 | M1<br>A1 | Not for reversed unless answer is correct showing intention.<br>*If no marks award SC1 for an answer of 17.9* |
| (d) 0.042 | B3<br>8 | B2 for sight of 0.042151… rounded or truncated, OR<br>B1 for sight of (1/)23.724…. |
| 2.<br><br>Examples:<br>(a) $(8 + 4) \times 5$ or $7 \times 8 + 4$ or $5 \times 8 + 24 - 4$ (=60)<br><br>(b) $24 \div 4 - (8 + 5)$ or $2 - (5 + 4)$ or $(5 + 2) \div 7 - 8$ (=-7)<br><br>(c) $7 \times (5 - 2)$ or $7 \times (8 - 5)$ or $24 + 2 - 5$ (= 21) | <br><br><br>B1<br><br>B1<br><br>B1<br>3 | **Accept equivalent correct responses using ONLY the cards given, not repeats within a single calculation**<br>Brackets must be used correctly<br>*Accept use of brackets for multiplication e.g. 2(24) (=48)*<br><br><br>Accept use of the – sign to create negative numbers<br>e.g.-24 ÷ 2 + 5 or 24 ÷ -2 + 5 |
| 3.(a) … × … × 11 = 385 or 385 ÷ 11<br>Attempt to find two whole numbers to multiply to 35<br>7(cm) and 5(cm) OR 35(cm) and 1(cm)<br><br>Look for<br>spelling<br>clarity of text explanations,<br>the use of notation and units<br><br>QWC2: Candidates will be expected to<br>present work clearly, with words explaining start, process or steps<br>AND<br>make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer<br><br>QWC1: Candidates will be expected to<br>present work clearly, with words explaining start, process or steps<br>OR<br>make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer<br><br>(b) ½ (4.5 + 8.8) × 1.9<br>12.6(35)<br>$cm^2$ | S1<br>M1<br>A1<br><br><br><br><br><br>QWC<br>2<br><br><br><br><br><br><br><br><br><br><br><br>M1<br>A1<br>U1<br>8 | Idea towards area of the base<br><br>Correct answers awarded all 3 marks.<br><br><br><br><br><br>QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.<br><br><br><br>Independent mark |
| 4. Area smaller circle = $\pi \times 6.2^2$<br>Process to find part shaded, e.g. $\times 5 \div 4$ or $\times 9 \div 4$ to find area of larger circle (and subtract area of the smaller circle)<br>Area shaded = $\pi \times 6.2^2 \times 5 \div 4$ or $\pi \times 6.2^2 \times 9 \div 4 - \pi \times 6.2^2$<br>Area shaded = 151 ($cm^2$) | M1<br>B1<br><br><br>m1<br>A2<br><br>5 | <br><br><br><br>(271.71… - 120.76…)<br>A1 for answers between 150.87… to 151.014…<br>*If M1 only, then also award SC1 for 121* |

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| Methods Unit 2 Higher Tier<br>January 2015 | Mark | Comment |
|---|---|---|
| 5.(a) Indication of:<br>C: $1.23\times600$<br>K: $^1/_6 \times 400$<br>D: $^2/_5 \times 500$<br>A: $1^2/_5 \times 700$ | B3 | All 4 correct calculations, or<br>B2 for any 3 correct, or<br>B1 for any 1 or 2 correct |
| (b) $(x)$ **× 1.2(0)** or equivalent, where $x \neq 0$ | M1 | Need not be shown as a measure with units, ignore units<br>Accept algebraic working throughout |
| $(x \times 1.2(0))$ **× 0.8(0)** or equivalent, where $x \neq 0$ | M1 | FT their value of $(x \times 1.2(0))$ provided $>x$<br>*Accept sight of ×1.2 for M1 and ×0.8 for M1, or sight of ×0.96 for M2* |
| $x\times1.2(0)\times0.8(0)$ correctly evaluated | A1 | $x \times 0.96$ correctly evaluated<br>Accept a conclusion that less than the original because decrease amount > increase amount, provided both amounts have been correctly evaluated. |
| | 6 | |
| 6.<br>(a) $(x =)$ 4 | B1 | Accept embedded answers in (a) , (b) & (c) |
| (b) $12x - 27 = 33$ OR $4x - 9 = 33/3$<br>$12x = 60$ OR $4x = 20$<br>$x = 5$ | B1<br>B1<br>B1 | FT until 2nd error |
| (c) $x + 17 = 5 \times 3$<br>$x = -2$ | M1<br>A1 | Or $x/3 = 5 - 17/3$ |
| (d) $x < 349/66$ or $x < 5.2878\ldots$ or $x < 5^{19}/_{66}$<br>Answer of 5 | M1<br>A1 | An answer of 5 implies '<' applied, so M1, A1 |
| (e) $5x < 22 + 188$ | M1 | No marks for '=' unless final replaced to give $x<42$ then award M1, A1. An answer of $x<210/5$ gets M1, A0 |
| $x< 42$ | A1 | CAO Mark final answer<br>If no marks award SC1 for $5x<166$ ($x<166/5$) with an answer $x<33.2$, or for $5x < 200$ with an answer $x < 40$ |
| | 10 | |
| 7. $(p^2 =) 2.7^2 + 4.1^2$<br>$p^2 = 24.1$ or $p = \sqrt{24.1}$ | M1<br>A1 | Correct statement<br>Power 2 or intention to take square root must be shown |
| $(q^2 =) 14.6^2 - 6.2^2$ or $14.6^2 = q^2 + 6.2^2$<br>$q^2 = 174.72$ or $q= \sqrt{174.72}$ | M1<br>A1 | Correct statement<br>Power 2 or intention to take square root must be shown<br>Accept rounded or truncated from correct working<br>*Alternative method using trigonometry:*<br>*M1 complete method to obtain an expression involving p e.g. angle = $\tan^{-1}(2.7/4.1)$ AND sin(angle) = 2.7/p*<br>*A1 expression with p as subject: e. g. p = 2.7/sin(angle)*<br>*M1 complete method to obtain expression involving q, e.g. angle = sin-1(6.2/14.6) AND cos(angle) = q/14.6*<br>*A1 expression with q as subject: e.g. q = 14.6cos(angle)* |
| (p =) 4.9(09175…cm) AND (q =) 13.2(18… cm) | A1<br>5 | |
| 8.(a) Correct reflection | B2 | B1 for reflection in the y-axis OR<br>B1 for 4 of the vertices reflected correctly |
| (b) Correct rotation | B2 | B1 for clockwise 90° rotation about (1, -1) OR<br>B1 for anticlockwise 90°rotation about (-1, 1) |
| (c) 0, 0 | B1 | |
| -½ or -0.5 or 'negative half' or equivalent | B2<br>7 | B1 for sight of ½ or 0.5 or half (including +½) |

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| Methods Unit 2 Higher Tier<br>January 2015 | Mark | Comment |
|---|---|---|
| 9.(a) (b =) 3/24 (=1/8)<br>(a =) 48 / $^1/_8$ or (a =) 48 × 8(/1)<br>(a =) 384 | M1<br>M1<br>A1 | (a =) 48 / $^3/_{24}$ gains M2<br>FT 'their calculated b'<br>CAO |
| (b) (Scale factor =) 4/0.8 (=5) OR 0.8/4 (= 0.2)<br>OR $y$ = k$x$ with 0.8 = k×4 or $x$=k$y$ with 4 = k×0.8<br>OR $\frac{x}{4} = \frac{6}{0.8}$ OR $\frac{x}{6} = \frac{4}{0.8}$ | M1 | |
| ($x$ =) 6 × (4/0.8) OR 6 / (0.8÷4)<br>(6 × 5) (6 / 0.2) | M1 | Allow M1 for correct substitution for their SF in their proportion equation, or for a reversed substitution in their proportion equation correctly evaluated |
| = 30 | A1<br>6 | CAO<br>A0 if left as 30 proportional to 6 |
| 10.(a) 5.4(4) × $10^8$ | B1 | |
| (b) 2 × $10^{18}$ | B1 | |
| (c) 1000 × 6 000 000 or 6 000 000 000<br>or 1000 × 6 × $10^6$ | M1 | |
| 6 × $10^9$ | A1<br>4 | |
| 11. Correct substitution into the quadratic formula<br>x = (-5 ±√($5^2$ - 4×1×2) ) / 2×1 | M1 | Allow 1 slip in substitution |
| x = (-5±√17)/2 | A1 | OR sight of 0.43(84…) with -4.5(615...)<br>*Alternative using completing the square:*<br>M1 for $x + \frac{5}{2} = \pm\sqrt{\frac{25}{4} - 2}$<br>A1 for $x = -\frac{5}{2} \pm \sqrt{\frac{17}{4}}$ |
| x = -0.44 with x = -4.56 | A1<br>3 | Must be to 2 decimal places<br>Award all 3 marks for correct unsupported answers. |
| 12. Label axes 'length (of tile in cm)' and 'width (of tile in cm)' | B1 | Either order. Accept l and w. |
| Both scales uniform from 0 to 20 inclusive | B1 | |
| Sight of any two points correct, in list or plotted | M1 | Allow (0,20) and (20,0) |
| Straight line drawn from (0,20) to (20,0) exclusive | A1<br>4 | Accept including (0,20) and (20,0)<br>Allow if the line touches the axes, but intention clear to end at the axes (allow ±2mm). However, A0 if this line extends beyond an axis. |
| 13.(a) $x$/8.32= 3.6/5.76 or equivalent or sight of scale factor 1.6 or 0.625 if used appropriately | M1 | |
| ($x$ =) 5.2 (cm) | A1 | |
| (b) Sight of $1.6^2$ or $0.625^2$ or equivalent | B1 | |
| (Area larger shape =) $1.6^2$ × 13.6 or 13.6 ÷ $0.625^2$ | M1 | FT their scale factor from (a) provided it was >1 and <2 (or its reciprocal provided >0.5 and <1) |
| 34.8(16) ($cm^2$) | A1<br>5 | Accept an answer of 35 ($cm^2$) from correct working only. |
| 14.(a) **MN** = **-OM** + **ON** (= -(2**a**+3**b**) +(5**a** + 7**b**) ) | M1 | Accept intention of brackets |
| = 3**a** + 4**b** | A1 | CAO. Must be simplified form |
| (b) Sight of -½(8**a**- 2**b**) or ½(8**a**- 2**b**) | B1 | May be simplified at a later stage |
| **RN** = -½**OP** + **ON** ((= -½(8**a**- 2**b**) +(5**a** + 7**b**) ) | M1 | Intention of brackets<br>Award SC1 for -4**a** - **b** + 5**a** + 7**b** if B1 not previously awarded. |
| = **a** + 8**b** | A1<br>5 | CAO. Must be simplified form |

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| Methods Unit 2 Higher Tier<br>January 2015 | Mark | Comment |
|---|---|---|
| 15. Strategy: attempt to calculate BD, then CD and then attempt ½abSinC | S1 | |
| $BD^2 = 6.2^2 + 5.8^2 - 2\times6.2\times5.8\times\cos78(°)$ | M1 | Correct substitution |
| $BD^2 = 57.1269912\ldots$ or $BD = \sqrt{57.12\ldots}$ (=7.558..cm) | A1 | Accept rounded or truncated |
| DC = sin65° × BD/sin85(°) | M2 | M1 for correct use of sine rule with DC implicit<br>Accept rounded or truncated |
| DC = 6.876…(cm) | A1 | FT correct evaluation with their BD provided all previous M marks awarded |
| Area DEC = ½ × 3.7 × DC × sin 59(°) | M1 | |
| 10.9(…$cm^2$) | A1 | FT correct evaluation with their DC provided all previous M marks awarded and without PA<br>Penalise (PA) premature approximation only by not awarding this final A mark |
| | 8 | |
| 16.(a) ½(x + 3)(y +6) (= 28.875) | B1 | Intention of brackets must be shown in subsequent working |
| xy + 3y + 6x + 18 = 2 × 28.875<br>OR ½xy +1.5y + 3x +9 = 28.875 | M1 | |
| xy + 3y + 6x = 39.75 | A1 | Must be convincing from correct working |
| (b) y + x+3 + y + x + 3 = 20 or y + x + 3 = 10<br>or 2y + 2(x+3) = 20 or equivalent | B1 | Intention of brackets may be shown in subsequent working |
| Method to solve, e.g. appropriate substitution of either x = 7 – y or y = 7 – x into xy + 3y + 6x = 39.75 | M1 | Accept sight of unsimplified substitutions, intention clear. For the intention of substitution not the accuracy of the transformed equation, so FT x = 'their ±7 ± y' or y = 'their ±7 ± x' and other similar substitutions following B0, for M1 and possible final B1 only. |
| $x^2 - 10x + 18.75 = 0$ or $y^2 - 4y - 2.25 = 0$ | A1 | OR $-x^2 + 10x - 18.75 = 0$ or $-y^2 + 4y + 2.25 = 0$ |
| (x – 2.5)(x - 7.5) = 0 or (y – 4.5)(y + 0.5) = 0 or (2x –5)(2x - 15) = 0 or (2y – 9)(2y + 1) = 0 or equivalent | A1 | OR $x = (10 \pm\sqrt{25})/2$ or $y = (4\pm\sqrt{25})/2$ |
| x = 2.5(cm) AND y = 4.5(cm) | A1 | Ignore inclusion of x = 7.5 or y = -0.5<br>A0 B0 if the **only** solutions given do not satisfy -3 < x < 7 and 0 < y < 10<br><br>**Special case:** Area of rectangle = 20 B0<br>Eliminating y (leading to 6x = 19.75) SC M1<br>x = 3.2(9166…) AND y = 3.1(788… ) truncated or rounded A0 A0 SC A1 |
| Dimensions of the rectangle are<br>(y=) 4.5(cm) AND (x+3 =) 5.5(cm) | B1 | Only depends on the award of M1<br>With no extra spurious dimensions |
| | 9 | |
| 17.(a) Idea of right angled triangle shown or used with height b, base a | M1 | Any correct answer implies M1 |
| $\cos\theta = a(/1)$ | A1 | OR $a/\sqrt{(a^2 + b^2)}$ |
| $\tan\theta = b/a$ | A1 | |
| $\sin\theta = b(/1)$ | A1 | OR $b/\sqrt{(a^2 + b^2)}$<br>Penalise -1 once only for consistent use of values other than a and b providing the hypotenuse is still 1 |
| | 4 | |



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| Surname | Centre Number | Candidate Number |
|---|---|---|
| Other Names | | 0 |

# GCSE LINKED PAIR PILOT

4364/01

# METHODS IN MATHEMATICS

## UNIT 2: Methods (Calculator)
## FOUNDATION TIER

A.M. TUESDAY, 17 June 2014

1 hour 30 minutes

4364
010001

### ADDITIONAL MATERIALS

A calculator will be required for this paper.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take $\pi$ as 3·14 or use the $\pi$ button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **5**.

| For Examiner's use only | | |
|---|---|---|
| **Question** | **Maximum Mark** | **Mark Awarded** |
| **1.** | **4** | |
| **2.** | **10** | |
| **3.** | **4** | |
| **4.** | **6** | |
| **5.** | **6** | |
| **6.** | **7** | |
| **7.** | **13** | |
| **8.** | **5** | |
| **9.** | **6** | |
| **10.** | **3** | |
| **11.** | **8** | |
| **12.** | **5** | |
| **13.** | **3** | |
| **Total** | **80** | |

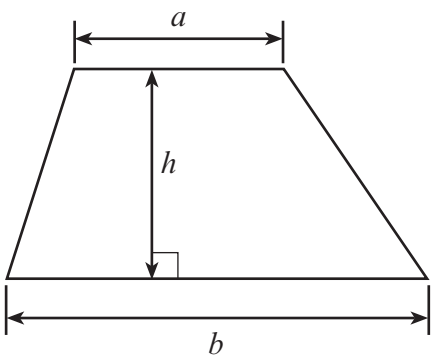
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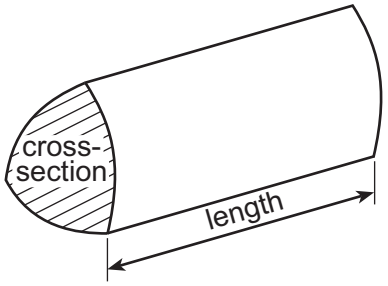
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## Formula List

**Area of trapezium** $= \frac{1}{2}(a + b)h$




**Volume of prism** = area of cross-section × length

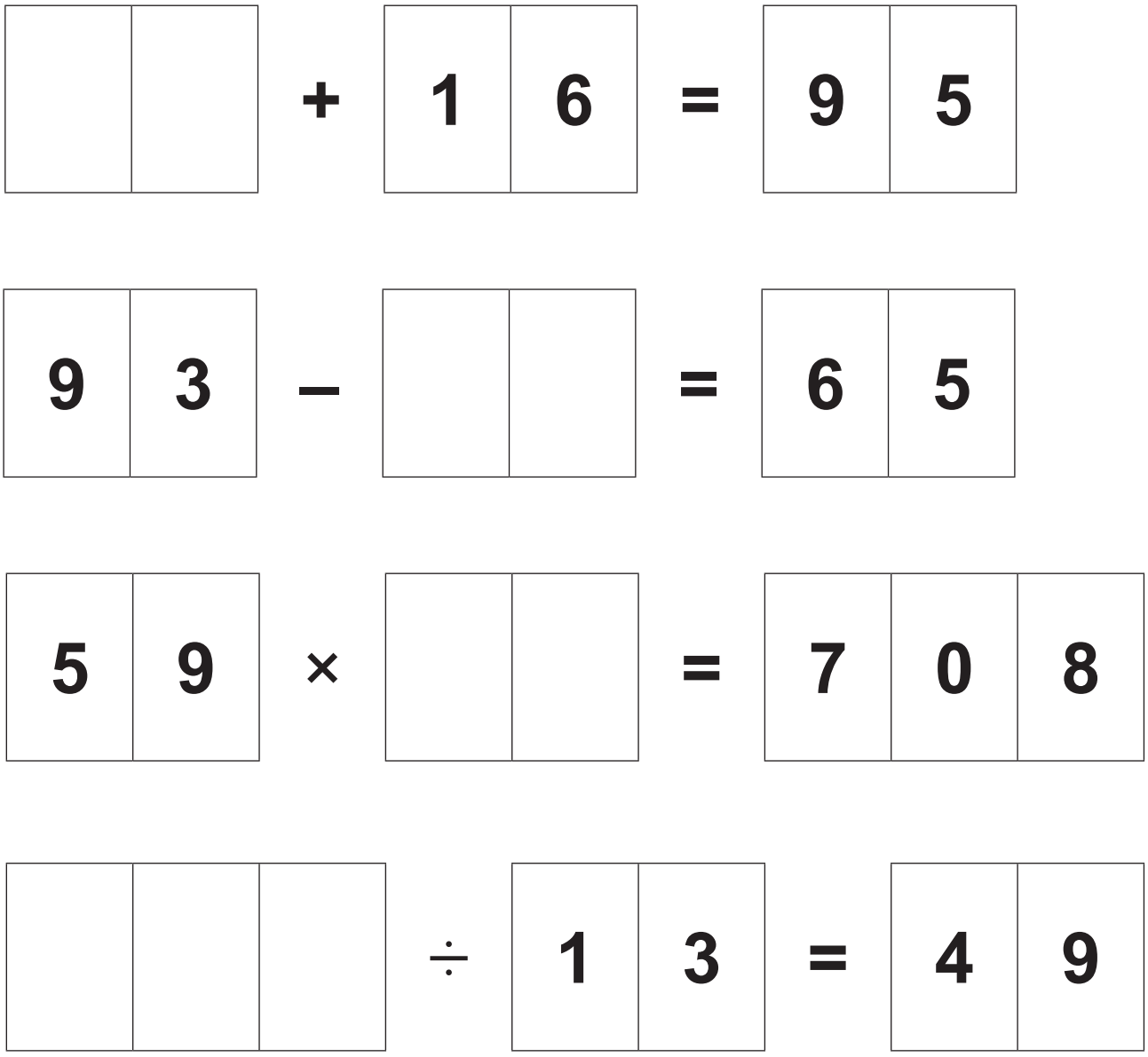



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**1.** Fill in the missing numbers. [4]




4364 010003

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**Turn over.**

Examiner only

**2.** *(a)* Write down the **largest** four digit number that can be made using all the digits 3, 2, 7 and 8. [1]

.....

*(b)* Write down the **smallest odd** four digit number that can be made using all the digits 3, 2, 7 and 8. [1]

.....

*(c)* Circle **three** of the following that have the same value as $\frac{4}{10}$ . [3]

**40%** **4%** **0·04** $\frac{\mathbf{2}}{\mathbf{4}}$

**0·4** **0·25** $\frac{\mathbf{2}}{\mathbf{5}}$

*(d)* Ceri pays for 7 toys with a £10 note.
Each toy costs the same amount.
He is given £1.53 change.
How much does each toy cost? [3]

.....

.....

.....

.....

*(e)* Use either the symbol < or > in order to make each statement true. [2]

2 ..... 9

10 ..... –1

–5 ..... –7

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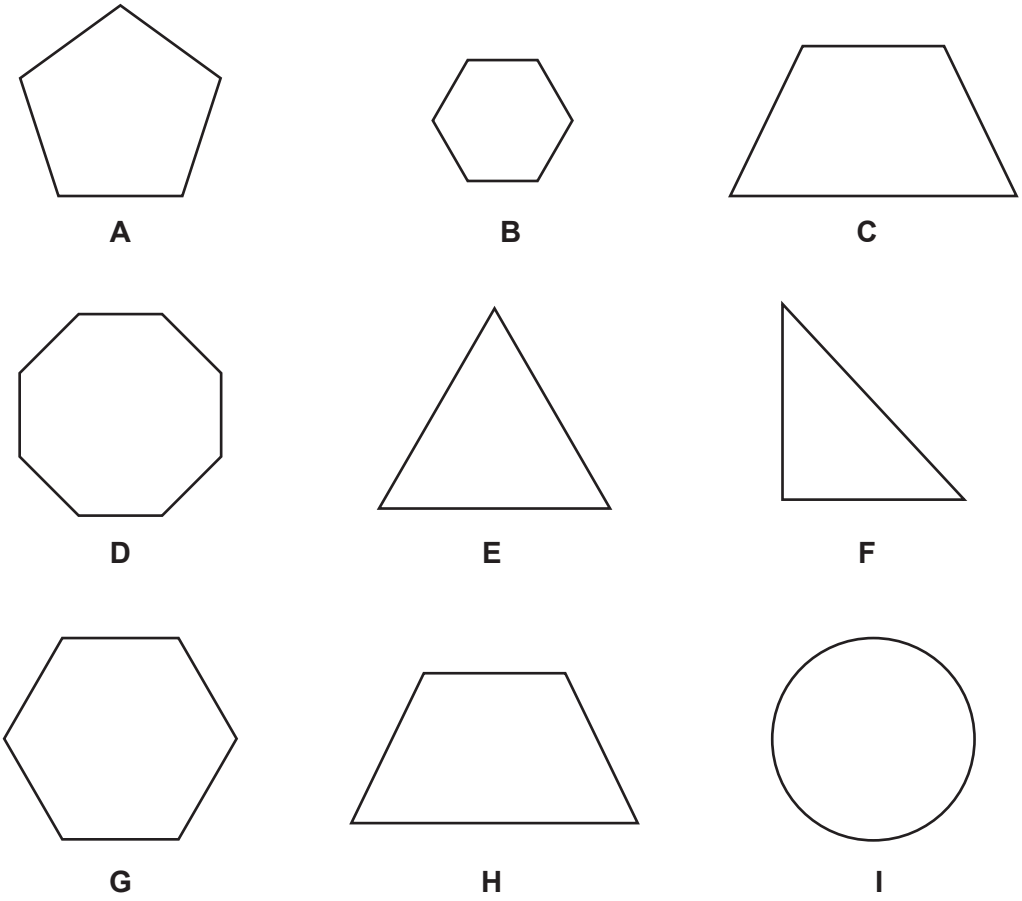
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**3.** *(a)*




Use the diagrams above to identify and write down [2]

- a pair of congruent shapes,

.....

- a pair of shapes that are similar but not congruent.

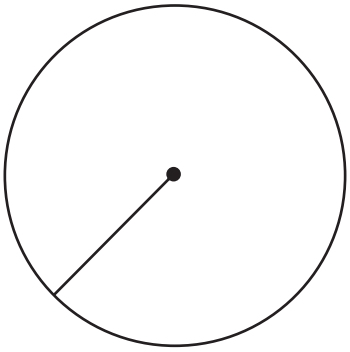
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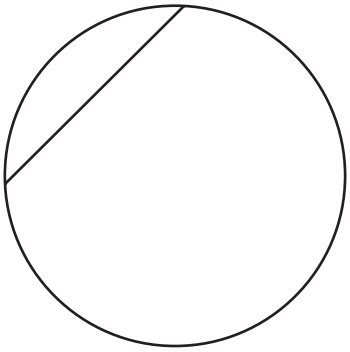
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*(b)* Write down the special name of the straight line shown in each of the following diagrams. [2]



.....



.....



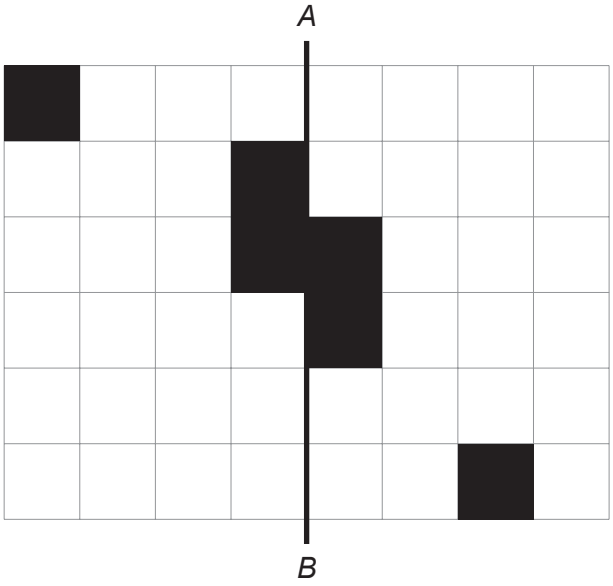
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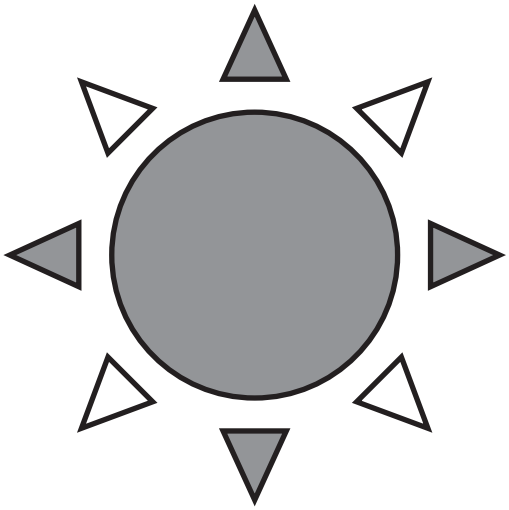
**4.** *(a)* Fill in the smallest number of boxes to make the following diagram symmetrical about the line *AB*. [2]




*(b)* Write down the order of rotational symmetry of the shapes below. [2]



Order of rotational symmetry = .....



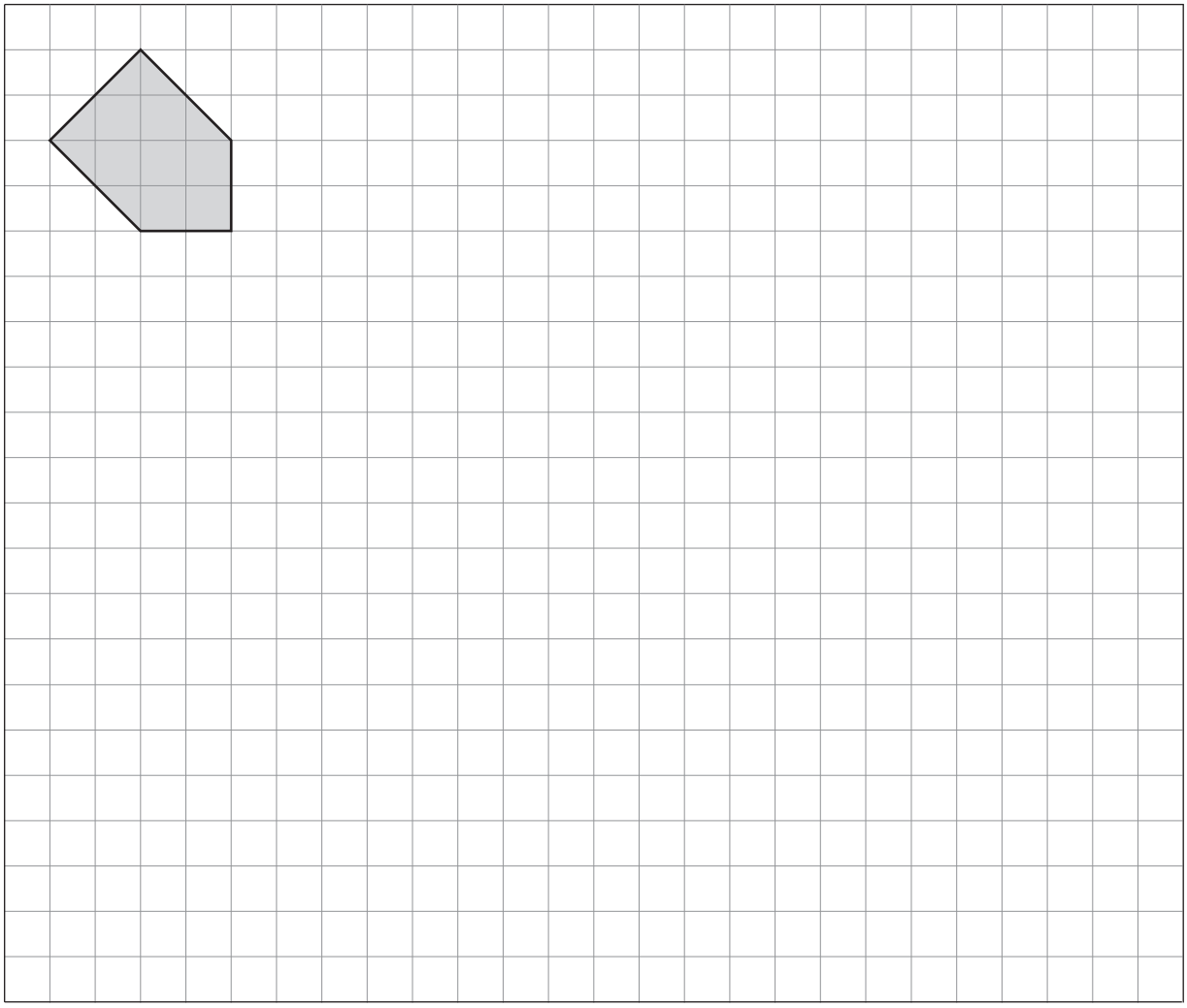
Order of rotational symmetry = .....

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*(c)* Enlarge the following shape by a scale factor of 3. [2]





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**5.** *You will be assessed on the quality of your written communication in this question.*

Two friends, Lisa and Neil, use the same recipe with six ingredients to make cheese scones for different numbers of people.

- Lisa used 200 g of flour, 1 teaspoon of mustard and 50 g of butter along with the other ingredients to make cheese scones for 10 people.
- Neil used 1 teaspoon of salt, 100 g of cheese and 250 ml of milk along with the other ingredients to make cheese scones for 20 people.

How much flour, mustard, butter, salt, cheese and milk are needed to make enough scones for 100 people?
You must show all your working. [6]

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**6.** *(a)* Find 67% of £234. [2]

*(b)* Find $\frac{2}{11}$ of 242 g. [2]

*(c)* **Showing all your working**, write 24%, 0·3 and $\frac{1}{4}$ in ascending order. [3]

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**Turn over.**

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**7.** *(a)* The perimeter of a square is 20 cm.
Calculate the area of this square.
You must show the units of your answer. [4]

*(b)* Calculate the area of the following triangle **giving your answer in $m^2$**. [3]

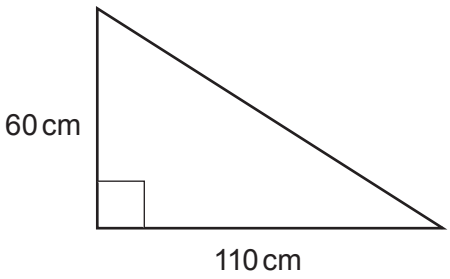



*Diagram not drawn to scale*

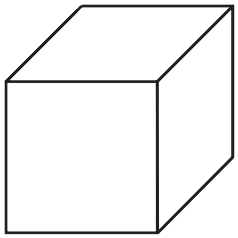
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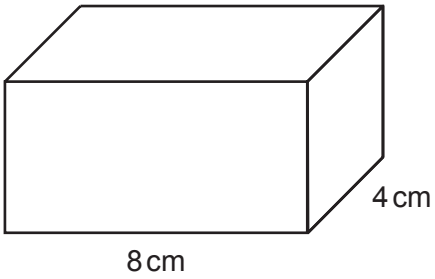
Examiner only

*(c)* Shape A is a cube.
Shape B is a cuboid.
Both shape A and shape B have the same volume.
What is the height of shape B? [4]

**Shape A**




**Shape B**




*Diagrams not drawn to scale*

.....

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.....

*(d)* Calculate the circumference of a circle with radius 20 cm. [2]

.....

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**8.** *(a)* Solve $x - 7 = 16$. [1]

.....

.....

*(b)* Solve $5x = 20$. [1]

.....

.....

*(c)* Solve $\frac{y}{8} = 9$. [1]

.....

.....

*(d)* Solve $4a + 3 = 39$. [2]

.....

.....

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**9.** *(a)* Use the following clues to find the missing number. [2]

- The number is between 8 and 9
- It is given correct to one decimal place
- It is exactly divisible by 0·3
- It is exactly divisible by 0·4

.....

.....

.....

.....

The missing number is: .....

*(b)* Find the value of $\sqrt{634{\cdot}1} - 2{\cdot}42^3$. Write down your answer correct to 2 decimal places. [2]

.....

.....

*(c)* Write down 2912 correct to 1 significant figure. [1]

.....

*(d)* Write down 0·0631 correct to 2 significant figures. [1]

.....

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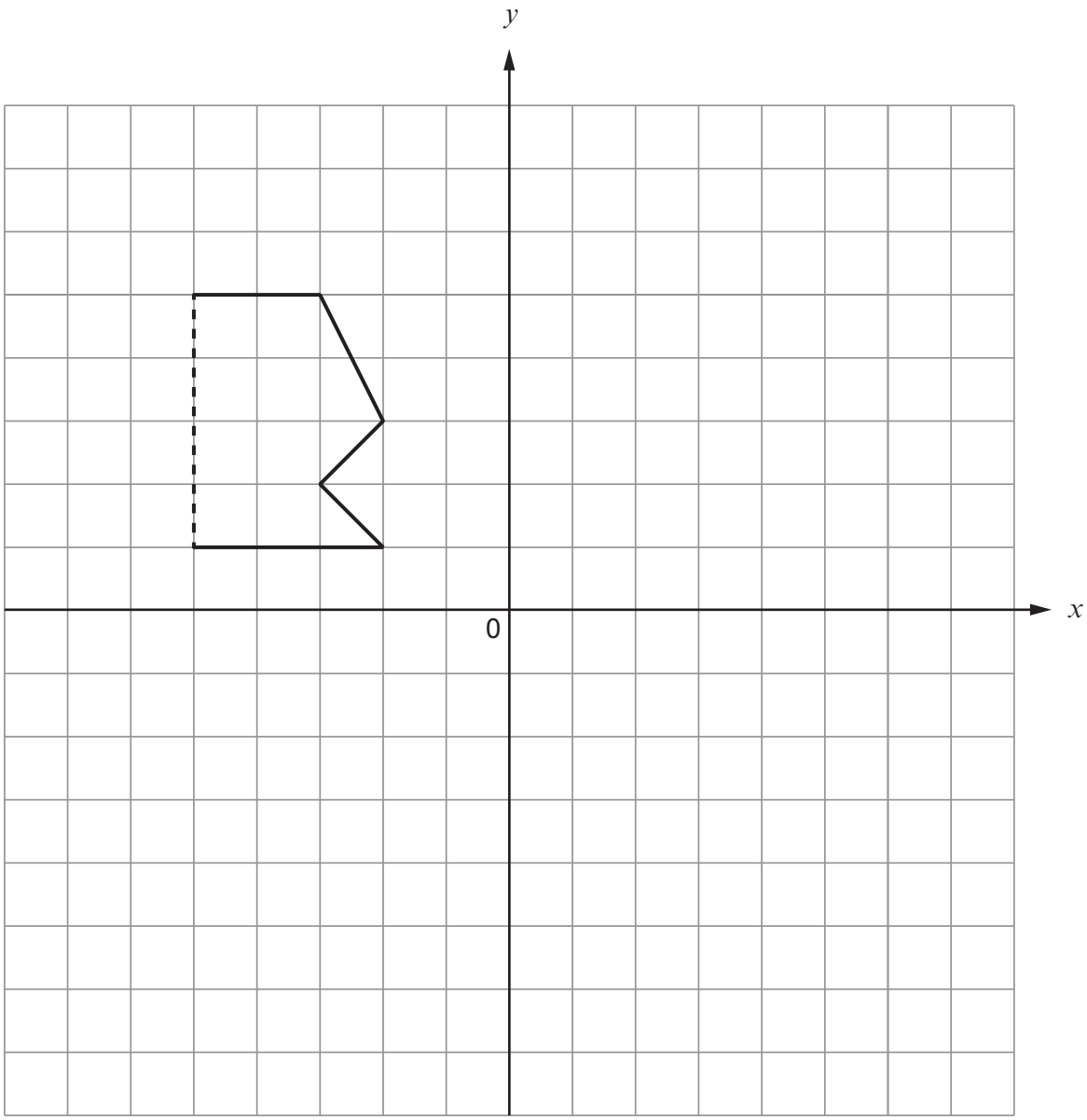


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**Turn over.**

Examiner only

**10.** Part of a shape is shown on the grid.
The dotted line is the line of symmetry of the shape.
Complete the drawing of the shape and then rotate your complete shape through 180° about the origin. [3]




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**11.** *(a)* Solve $6(3x - 17) = 42$. [3]

*(b)* Solve the inequality $9x + 5 < 77$. [2]

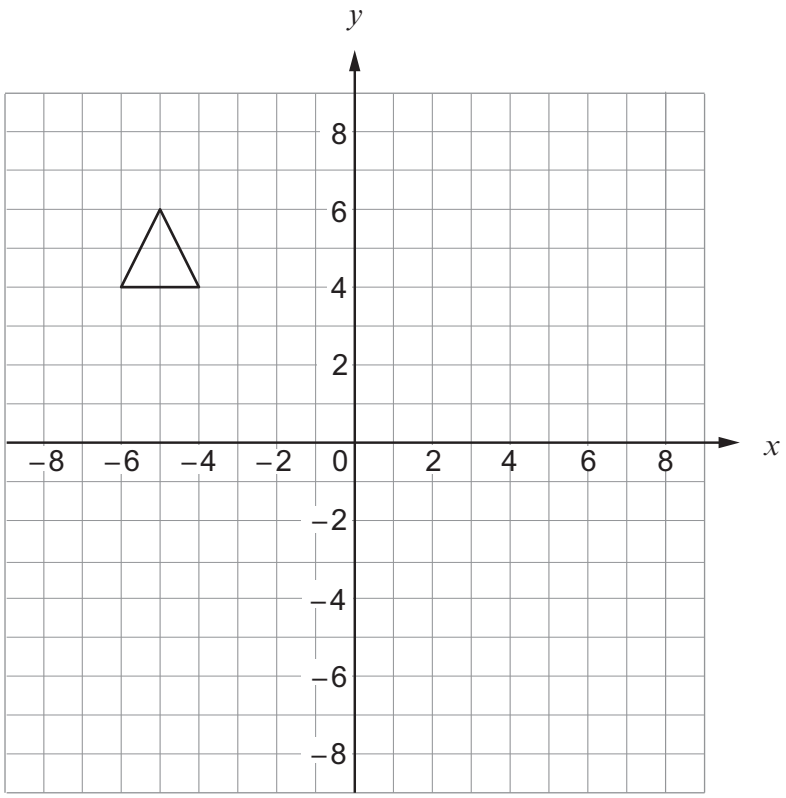
*(c)* The angles of a triangle are $x°$, $2x°$ and $3x°$.
Form an equation in $x$, and use your equation to find the sizes of the three angles. [3]

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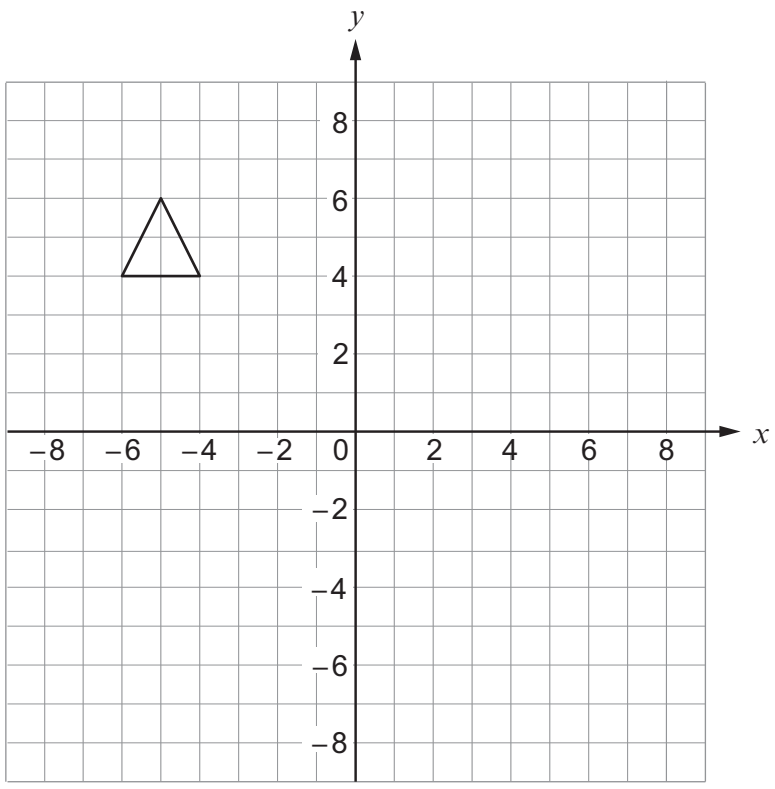
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**12.** *(a)* Translate the triangle shown below by $\begin{pmatrix} 8 \\ -2 \end{pmatrix}$. [1]




*(b)* Rotate the triangle through 90° anticlockwise using the point (–2, –1) as the centre of the rotation. [2]

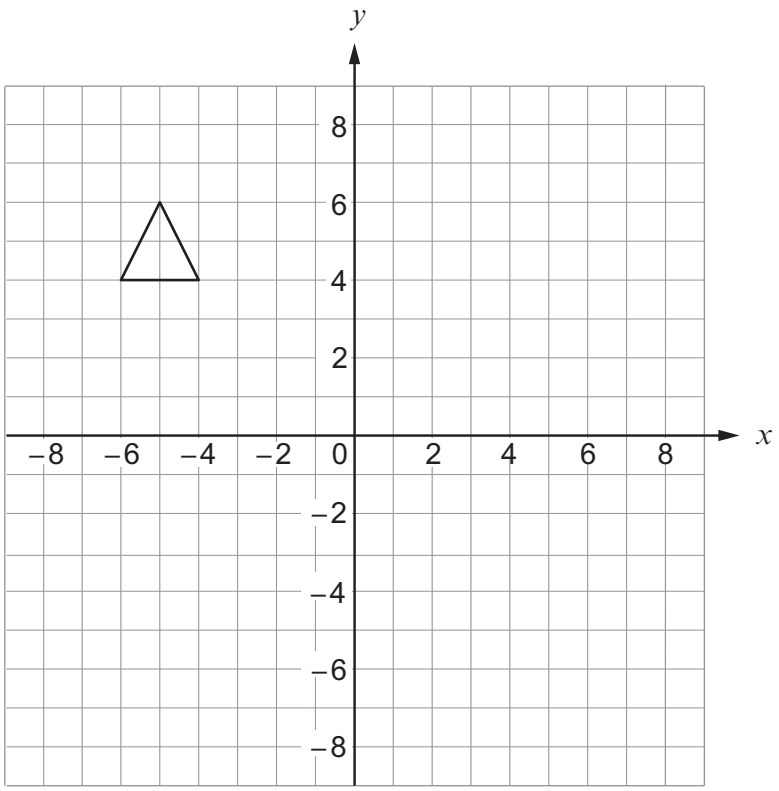



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*(c)* Reflect the triangle shown in the line $y = x$. [2]




**13.** [3]

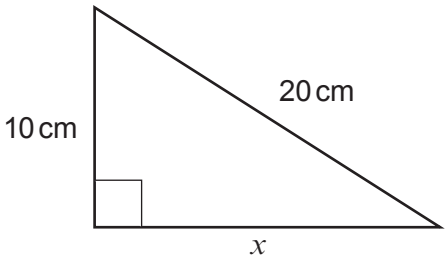



*Diagram not drawn to scale*

Calculate the length of the side marked $x$.

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.....

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.....

.....

**END OF PAPER**

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# GCSE MARKING SCHEME

## METHODS IN MATHEMATICS (LINKED PAIR PILOT)

## SUMMER 2014

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## INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2014 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

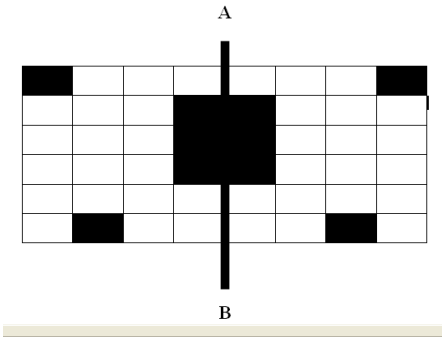
WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.


| | Page |
|---|---|
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| Unit 1 - Higher Tier | 5 |
| Unit 2 - Foundation Tier | 9 |
| Unit 2 - Higher Tier | 13 |


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## UNIT 2 (FOUNDATION TIER)

| Methods in Mathematics<br>June 2014 Unit 2 Foundation Tier | Mark | Comments |
|---|---|---|
| 1. 79<br>28<br>12<br>637 | B1<br>B1<br>B1<br>B1<br>4 | |
| 2. (a) 8732<br>(b) 2387<br>(c) 40% and 2/5 and 0.4<br><br><br><br>(d) (£)10- (£)1.53 = (£8.47)<br>$\frac{(£)10- (£)1.53}{7}$ OR $\frac{(£)8.47}{7}$<br>(£)1.21<br><br>(e) <<br>><br>><br><br>10 | B1<br>B1<br>B3<br><br><br><br>M1<br>M1<br><br>A1<br><br>B2<br><br><br> | <br><br>B2 for 3 correct and 1 incorrect<br>B2 for 2 correct and no more than1 incorrect<br>B1 for 1 correct and no more than 1 incorrect<br>B1 for 2 or 3 correct and 2 incorrect<br><br><br><br>CAO<br><br>B1 for any two correct |
| 3. (a) C and H<br>B and G<br><br>(b) Radius<br>Chord<br><br>4 | B1<br>B1<br><br>B1<br>B1<br>4 | Accept trapezium<br>Accept hexagon |
| 4. (a)<br><br><br><br>(b) 2<br>4<br><br>(c) Enlargement of scale factor 3 | B2<br><br><br><br><br><br><br><br>B1<br>B1<br><br>B2<br>6 | B1 for 3 or 4 correct and 1 incorrect<br>OR 3 correct and no incorrect<br>B1 for between 5 and 8 shaded to produce a symmetrical diagram<br><br><br><br><br><br><br><br><br><br>B1 for any two lines correct or 3 points correct<br>B1 for correct enlargement using different scale factor |



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| Methods in Mathematics<br>June 2014 Unit 2 Foundation Tier | Mark | Comments |
|---|---|---|
| 5. Lisa's ingredients × 10<br><br>2000(g of flour) OR 2kg<br>10 (teaspoons of mustard)<br>500(g of butter)<br><br>Neil's ingredients × 5<br><br>5 (teaspoons of salt)<br>500(g of cheese)<br>1250(ml of milk) OR 1.25 l(itres)<br><br>Look for:<br>Correct use of Units<br>Labels<br><br>QWC2: Candidates will be expected to<br>• present relevant work clearly, with words explaining process or steps<br>AND<br>• make few if any mistakes in spelling, punctuation and grammar<br><br>QWC1: Candidates will be expected to<br>• present work clearly which is mostly relevant, with words explaining process or steps<br>OR<br>• make few if any mistakes in spelling, punctuation and grammar and include units in their final answer | M1<br><br>A1<br><br><br><br>M1<br><br>A1<br><br><br><br><br><br>QWC 2<br><br><br><br><br><br><br><br><br><br><br><br><br><br>6 | Or equivalent<br>Attempt at least one of the three ingredients<br>All 3 correct<br><br>Or equivalent<br>Attempt at least one of the three ingredients<br>All 3 correct<br><br>QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| 6. (a) 67/100 × 234<br>=(£) 156.78<br><br>(b) 2/11 × 242<br>= 44 (g)<br><br>(c) For 2 correct in a form which allows comparison<br>For all 3 correct in a form which allows comparison<br>24%, ¼, 0.3 | M1<br>A1<br><br>M1<br>A1<br><br>B1<br><br>B1<br><br>B1<br>7 | Or equivalent<br><br>Or equivalent<br><br><br>Eg 1\4 = 25% = 0.25<br><br>Or equivalent<br>Answer only gets B0, B0, B1 |



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| Methods in Mathematics<br>June 2014 Unit 2 Foundation Tier | Mark | Comments |
|---|---|---|
| 7. (a) 20/4 or 5cm<br>5 × 5<br>25<br>cm² | B1<br>M1<br>A1<br>U1 | <br><br><br>Independent of other marks |
| (b) (0.6 × 1.1 )/ 2 OR (60 × 110 )/ 2<br>0.33(m² ) | M1<br>A2 | <br>A1 for 3300($cm^2$) or 0.66/2 or 0.3×1.1 or 0.6×0.55 |
| (c) 4 × 4 × 4<br>64 ($cm^3$)<br>64 / (8×4) or 32h=64<br>2 (cm) | M1<br>A1<br>M1<br>A1 | *Alternative method:*<br>*4 × 4 M1*<br>*16 ($cm^2$) A1*<br>*16/8 M1*<br>*2 (cm) A1* |
| (d) 2π × 20 or π × 40<br>125.6(637...cm) to 125.7(2…cm) | M1<br>A1<br>13 | <br>Accept 126 |
| 8. (a) $x$=23<br>(b) $x$=4<br>(c) $y$ = 72<br>(d) 4a = 39 - 3<br>a = 9 | B1<br>B1<br>B1<br>B1<br>B1<br>5 | Allow embedded answers in all parts<br><br><br>FT 1 error<br> |
| 9. (a) Listing multiples of 0.3 or 0.4, including at least one between 8 and 9.<br>8.4<br>(b) 11.008854…..<br>11.01<br>(c) 3000<br>(d) 0.063 | S1<br>B1<br>B1<br>B1<br>B1<br>B1<br>6 | OR listing multiples of 3 or 4 including at least one between 80 and 90 with the intention to then insert the decimal point.<br>Award S1B1 for unsupported 8.4 |
| 10. Shape completed accurately with correct rotation seen | B3<br>3 | With no other 90° rotations shown<br>B2 for at least two lines correct in attempting to complete the shape with correct rotation of their shape with no other 90° rotations shown, OR<br>B1 for the shape completed correctly, or a correct rotation of the part of the shape given, ignore other 90° rotations shown |
| 11<br>(a) 18x – 102 = 42 OR 3x – 17 = 42/6<br>18x = 144 3x = 24<br>x=8<br>(b) 9x < 77 - 5<br>x<8<br>(c) $x$ +2$x$ +3$x$ = 180<br>$x$=30<br>Three angles are 30(˚), 60(˚), 90(˚) | <br>B1<br>B1<br>B1<br><br>M1<br>A1<br><br>M1<br>A1<br>A1<br><br><br><br>8 | Accept embedded answers in part (a)<br><br>FT from 1 error<br>FT until 2nd error<br><br>No marks for use of "=", unless finally replaced to give x<8 then award M1 A1.<br>SC1 for x<82/9 ISW<br><br><br><br>*SC1 for the answers of 30(˚), 60(˚) and 90(˚) without forming an equation*<br>*SC1 for the answers of 60(˚), 120(˚) and 180(˚) from equating to 360* |



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| Methods in Mathematics<br>June 2014 Unit 2 Foundation Tier | Mark | Comments |
|---|---|---|
| 12(a) Correct translation | B1 | |
| (b) Correct rotation | B2 | B1 near miss of grid lines, or for clockwise 90° about (-2, -1), or for anticlockwise 90° about (-1, -2) |
| (c) Correct reflection in $y = x$ | B2 | B1 for a reflection in $y = -x$,<br>OR for sight of the line $y = x$ |
| | 5 | |
| 13 | | |
| $(x^2 =) 20^2-10^2$ | M1 | |
| $x^2 = 300$ or $(x =) \sqrt{300}$ | A1 | x=300 gets M1, A0 unless intention of square rooting is shown |
| (x=) 17(.32… cm) | A1 | |
| | 3 | |



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# UNIT 2 HIGHER

| Methods in Mathematics<br>June 2014 Unit 2 Higher Tier | Mark | Comment |
|---|---|---|
| 1. Shape completed accurately with correct rotation seen | B3<br><br><br><br><br><br>3 | With no other 90° rotations shown<br>B2 for at least two lines correct in attempting to complete the shape with correct rotation of their shape with no other 90° rotations shown, OR<br>B1 for the shape completed correctly, or a correct rotation of the part of the shape given, ignore other 90° rotations shown |
| 2.<br>(a) (x =) 10×8/5<br>x = 16<br>(b) (x =) 4<br>(c) 18x – 102 = 42 OR 3x – 17 = 42/6<br>18x = 144 3x = 24 or x = 24/3<br>x=8<br>(d) 9x < 77 - 5<br>x<8<br><br>(e) x < 85/5 or x< 17<br>16 | <br>M1<br>A1<br>B1<br>B1<br>B1<br>B1<br>M1<br>A1<br><br>M1<br>A1<br><br><br><br>10 | Accept embedded answers in parts (a), (b) & (c)<br><br><br>Mark final answer. Do not accept 28/7<br>FT until 2nd error<br><br><br><br>No marks for use of "=", unless finally replaced to give x<8 then award M1 A1.<br>SC1 for x<82/9 ISW<br>Or sight of 5×16 = 80 with 5×17 =85<br>Accept unsupported 16, or a unique answer of 16 from a trial and improvement method. Do not accept x<16.<br>*SC1 for sight of 5x = 85, x = 17 followed by selecting x =16* |
| 3(a) 100 × 34 / 6800 or 100 × 34 ÷ 6800<br>0.5(%) or ½(%)<br>(b) 1.0225 × 34000 or 34000 + 34000 × 2.25 /100 or 102.25 × 34000/100<br>34765<br><br>(c) 0.26×1345 or ⅜×600 or 0.045×3600 or equivalent<br>349.7 (m)<br>225 (m)<br>162 (m)<br>160 230 350<br><br><br>(d) 450 × 4 ÷ 9<br>= 200<br>450 × 4 ÷ 5<br>= 360<br>Difference 160 | M1<br>A1<br>M1<br><br>A1<br><br>M1<br>A1<br>A1<br>A1<br>B1<br><br><br>M1<br>A1<br>M1<br>A1<br>A1<br>14 | <br><br>Accept 0.25 written as ¼<br><br><br>Any one correct calculation shown<br>Accept 349 or 350<br>Accept 230<br>Accept 160<br>Must all be 2 significant figures<br>FT provided at least 2 of the A marks awarded<br><br><br>Complete method<br>CAO<br>Complete method<br>CAO<br>Depend on both M marks |



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| Methods in Mathematics<br>June 2014 Unit 2 Higher Tier | Mark | Comment |
|---|---|---|
| 4.(Area of faces are) $2e \times 3e$, $2e \times 4e$, $3e \times 4e$, ($cm^2$)<br>($2e \times 3e$, $2e \times 4e$, $3e \times 4e$) ($cm^2$) | M2 | M1 for any one of the 3 unique expressions<br>These marks may be implied by correct simplified expressions |
| (Simplified equation for the total surface area is)<br>$52e^2 = 468$ | A2 | FT for M2 or M1 as appropriate, provided their simplified sum includes at least two of the expressions $6e^2$, $8e^2$, $12e^2$ and all three terms in the form $ae^2$.<br>A1 for (2 ×) [$6e^2 + 8e^2 + 12e^2$] OR $52e^2$ ($cm^2$)<br>A1 for $ae^2 = 468$ |
| $e^2 = 468/52$ (= 9)<br>$e = 3$ | B1<br>B1 | FT 'their equation' if in the form $ae^2 = 468$<br>FT 'their equation' if in the form $ae^2 = 468$ |
| (Volume = 6 × 9 × 12 =) 648 ($cm^3$) | B1 | FT 'their $e$' within $24 \times e^3$ correctly evaluated |
| Look for:<br>• if units given, are they correct?<br>• notation<br>• labels and joining text<br><br>QWC2: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>**AND**<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer<br><br>QWC1: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>**OR**<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer | *If no marks, then allow SC2 for $3e \times 4e \times 2e = 468$ leading to an answer of $e = 2.69...$ or 2.7, or SC1 for sight of $3e \times 4e \times 2e = 468$ or equivalent*<br><br>QWC<br>2<br><br>9 | QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| 5. 26.5 – 26.5 ×0.12 OR 26.5 × 0.88 (=23.3(2)<br><br>23.3(2 )– 23.3(2) × 0.08 OR 23.3(2 )× 0.92 (= 21.4544 or 21.436)<br><br>25.3 – 21.4544 (= 3.8456) OR 25.3 – 21.436(=3.864)<br><br>3.8(….°C) to 3.9(°C) from correct working | M1<br><br>M1<br><br>m1<br><br>A1<br>4 | OR M2 for<br>$26.5 \times 0.88 \times 0.92$<br><br>FT 'their 23.32', but not 26.5<br><br>Depends on both previous M marks<br>FT for their 23(.32) and their 21(….)<br><br>Accept 4(°C) from correct working |
| 6. Sight of any quotient using values from the table for a/b or b/a<br>$a = 2.5 \times b$<br>$b = 0.4 \times a$ | M1<br><br>A1<br>A1<br>3 | Or sight of 1 correct response, or answers reversed<br><br>Or equivalent<br>Or equivalent<br>FT from $a = 0.4 \times b$ to give $b = 2.5 \times a$ |
| 7.(a) $5.6 \times 10^{-5}$<br>(b) $2.3 \times 10^{9}$ | B1<br>B1<br>2 | |



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| Methods in Mathematics<br>June 2014 Unit 2 Higher Tier | Mark | Comment |
|---|---|---|
| 8. Idea to show or use the perpendicular height in a right angled triangle | S1 | Award for statement such as '6(cm) is not the vertical height' |
| Height = sin58° × 6 | M2 | M1 for sin58° = Height/6 |
| = 5(.088…cm) | A1 | |
| Area = 5(.088… )× 10 | M1 | FT their 5(.088…cm) provided prior M1 awarded or an attempt has been made to use a trig ratio |
| = 50.9($cm^2$) or 51($cm^2$) | A1 | Must be rounded. Do not accept 50.8 or 50 (from premature approximation). FT from M1 |
| | | *If S1 only, then use of spurious perpendicular height <6, then also award SC1 for their perpendicular height ×10 correctly evaluated* |
| | | *Alternative:* |
| | | *Use of ½ absinC* *S1* |
| | | *2 × ½ × 6 × 10 × sin 58°* *M3* |
| | | *or M2 for ½ × 6 × 10 × sin 58°* |
| | | *50.9($cm^2$) or 51($cm^2$)* *A2* |
| | 6 | *or A1 for calculating ½ required area* |
| 9(a) Correct translation | B1 | |
| (b) Correct rotation | B2 | B1 near miss of grid lines, or for clockwise 90° about (-2, -1), or for anticlockwise 90° about (-1, -2) |
| (c) Correct reflection in $y = x$ | B2 | B1 for a reflection in $y = -x$,<br>OR for sight of the line $y = x$ |
| (d) Enlargement scale factor ½ | B2 | B1 for any 1 line correct, or consistent incorrect fractional scale |
| Correct position | B1 | |
| | 8 | |
| 10. 26.7 = Π× d or 26.7 = 2 × Π× r or r = 26.7/Π | M1 | |
| Diagonal = 8.495… to 8.5(0…) (cm) | A1 | Accept rounded or truncated |
| $diagonal^2 = side^2 + side^2$ | M1 | FT their diagonal |
| $side^2 = diagonal^2/2$ | A1 | |
| side length = 6(.0096…cm) | A1 | Do not FT from inappropriate truncation or incorrect rounding (e.g. from d = 8.4)<br>Answer here for A1 should round to 6.01 |
| Perimeter = 24.(….cm) | B1 | FT provided both M marks awarded for 4× 'their side length' |
| | 6 | |
| 11.(a)(i) y = x **and** y = - x indicated<br>(2 quadrants for both) | B2 | B1 for either indicated in 2 quadrants, or both indicated in 1 quadrant each<br>B1 for indication of appropriate points at least 3 in each of the 4 quadrants<br>*Ignore any circles drawn* |
| (ii) y = x and y = - x or equivalent | B2 | CAO. B1 for either equation |
| (b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ | B1 | CAO |
| | 5 | |
| 12. sin XYZ/23.8 = sin123(°)/38.9 | M1 | OR 23.8/sin XYZ = 38.9/sin123(°) |
| sin XYZ = 23.8 × sin123(°)/38.9 | M1 | OR $\sin^{-1}$ 0.513... *This M1 implies previous M1* |
| XYZ = 30.871..( °) rounded or truncated correctly | A1 | |
| | 3 | |



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| Methods in Mathematics<br>June 2014 Unit 2 Higher Tier | Mark | Comment |
|---|---|---|
| 13. $y = 4 - x$ OR $x = 4 - y$<br>$2x^2 + x(4-x) - 5 = 0$ $2(4-y)^2 + (4-y)y - 5 = 0$<br>$x^2 + 4x - 5 = 0$ $y^2 - 12y + 27 = 0$<br><br>$(x - 1)(x+5) = 0$ $(y - 3)(y - 9) = 0$<br><br><br><br>$x = 1, x = -5$ OR $y = 3, y = 9$<br>$y = 3, y = 9$ $x = 1, x = -5$ | M1<br>M1<br>A1<br><br>M1<br><br><br><br>A1<br>A1<br><br><br><br><br>6 | OR For sight of $x^2 + xy = 4x$<br>OR Subtraction from 1st equation<br>OR $x^2 + 4x = 5$<br><br>FT provided quadratic from an appropriate substitution method or subtraction method<br>OR alternative method to solve , e.g. formula with correct substitution and $b^2$-4ac correctly simplified<br><br>*If A0, A0 then SC1 for x= 1, y=3* ***OR*** *x= -5, y=9 provided algebraic method shown with appropriate M1, M1, M1 marks*<br><br>*No marks for trial & improvement methods* |
| 14(a) 6:2 and 7:QR or equivalent, or scale factor 7/6<br>QR = 2 × 7 ÷ 6 or equivalent<br>QR = 2.3(33…cm)<br><br>(b) AE = 4x<br>AF = 5.5 y<br>(Perimeter =) 6x + 8.5y or 6x +17y/2 ISW | B1<br>M1<br>A1<br><br>B1<br>B1<br>B1<br><br>6 | OR 6:8 and 7:**PR** or equivalent<br>OR **PR** = 7 × 8 ÷ 6 (= 9.33…) or equivalent<br><br><br><br><br>CAO. Must be simplified<br>Accept ½ (12x + 17y)<br>Answers of 4x + 5.5y + 2x + 3y imply B1, B1, B0 |
| 15. b = 45(°)<br>c = 180(°) | B1<br>B1<br>2 | |
| 16(a) **HK** = **HL** + **LK** (= 5**x** + 6**y** + 3**x** – 6**y**)<br>= 8**x** (+0**y**)<br>(b)(i) **LN** = 3**x** – 6**y** + 18**x** – 36**y** (=21**x** – 42**y**)<br>k = 7<br><br>(ii) Collinear (or lie along the same straight line) | M1<br>A1<br>M1<br>A1<br><br>B1<br>5 | <br><br><br>May be embedded. Award M1, A1 for sight of k=7<br><br>Do not accept parallel as a full description |
| 17. Area of the square base = 119.8 – 4 ×23.6<br>= 25.4($cm^2$)<br>(Volume pyramid) 76.4 = ⅓ × 25.4 × height<br><br>height = 9.02… cm<br><br>(Volume cone) 44.4 = ⅓ × π × $r^2$ × height<br><br>$r^2$ = 44.4/(⅓ × π × height)<br><br>$r^2$ = (44.4 × ⅓ × 25.4) / (76.4 × ⅓ × π)<br>$r^2$ = 4.69… to 4.701…<br>(radius) 2.17 or 2.2 (cm) | M1<br>A1<br>m1<br><br>A1*<br><br>M1*<br><br>M1<br>A1<br><br><br>A1<br><br><br><br><br><br><br><br>8 | <br><br>FT their area of square base<br>Note √25.4 = 5.0398…× 5.0398…<br><br><br>Depends on all previous method marks, FT their height<br><br>FT equivalent difficulty, isolating $r^2$<br>CAO.<br>OR $r^2$ = 4.7, or an appropriate unrounded r, r = 2.1681875… to 2.17<br>CAO.<br>Appropriate degree of accuracy required<br><br>*Alternative for A1*, M1**<br>*Equating heights,*<br>76.4 / (⅓ × 25.4) = 44.4 /(⅓ × π × $r^2$)<br><br>*For information:*<br>*Common height = 9.02(cm)*<br>*Height of a triangular face = 9.37(cm)* |



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## UNIT 2 (HIGHER TIER)

| Methods in Mathematics<br>Unit 2 Higher Tier June 2014 | Mark | Comment |
|---|---|---|
| 1. Shape completed accurately with correct rotation seen | B3<br><br><br><br><br>3 | With no other 90° rotations shown<br>B2 for at least two lines correct in attempting to complete the shape with correct rotation of their shape with no other 90° rotations shown, OR<br>B1 for the shape completed correctly, or a correct rotation of the part of the shape given, ignore other 90° rotations shown |
| 2.<br>(a) (x =) 10×8/5<br>x = 16<br>(b) (x =) 4<br>(c) 18x – 102 = 42 OR 3x – 17 = 42/6<br>18x = 144 3x = 24 or x = 24/3<br>x=8<br>(d) 9x < 77 - 5<br>x<8<br><br>(e) x < 85/5 or x< 17<br>16 | <br>M1<br>A1<br>B1<br>B1<br>B1<br>B1<br>M1<br>A1<br><br>M1<br>A1<br><br><br>10 | Accept embedded answers in parts (a), (b) & (c)<br><br><br>Mark final answer. Do not accept 28/7<br>FT until 2nd error<br><br><br>No marks for use of "=", unless finally replaced to give x<8 then award M1 A1.<br>SC1 for x<82/9 ISW<br>Or sight of 5×16 = 80 with 5×17 =85<br>Accept unsupported 16, or a unique answer of 16 from a trial and improvement method. Do not accept x<16.<br>*SC1 for sight of 5x = 85, x = 17 followed by selecting x =16* |
| 3(a) 100 × 34 / 6800 or 100 × 34 ÷ 6800<br>0.5(%) or ½(%)<br>(b) 1.0225 × 34000 or 34000 + 34000 × 2.25 /100 or 102.25 × 34000/100<br>34765<br><br>(c) 0.26×1345 or ⅜×600 or 0.045×3600 or equivalent<br>349.7 (m)<br>225 (m)<br>162 (m)<br>160 230 350<br><br>(d) 450 × 4 ÷ 9<br>= 200<br>450 × 4 ÷ 5<br>= 360<br>Difference 160 | M1<br>A1<br>M1<br><br>A1<br><br>M1<br>A1<br>A1<br>A1<br>B1<br><br><br>M1<br>A1<br>M1<br>A1<br>A1<br>14 | <br><br>Accept 0.25 written as ¼<br><br><br>Any one correct calculation shown<br>Accept 349 or 350<br>Accept 230<br>Accept 160<br>Must all be 2 significant figures<br>FT provided at least 2 of the A marks awarded<br><br>Complete method<br>CAO<br>Complete method<br>CAO<br>Depend on both M marks |

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| Methods in Mathematics<br>Unit 2 Higher Tier June 2014 | Mark | Comment |
|---|---|---|
| 4.(Area of faces are) $2e \times 3e$, $2e \times 4e$, $3e \times 4e$, ($cm^2$)<br>($2e \times 3e$, $2e \times 4e$, $3e \times 4e$) ($cm^2$) | M2 | M1 for any one of the 3 unique expressions<br>These marks may be implied by correct simplified expressions |
| (Simplified equation for the total surface area is)<br>$52e^2 = 468$ | A2 | FT for M2 or M1 as appropriate, provided their simplified sum includes at least two of the expressions $6e^2$, $8e^2$, $12e^2$ and all three terms in the form $ae^2$.<br>A1 for $(2 \times) [6e^2 + 8e^2 + 12e^2]$ OR $52e^2$ ($cm^2$)<br>A1 for $ae^2 = 468$ |
| $e^2 = 468/52$ (= 9)<br>$e = 3$ | B1<br>B1 | FT 'their equation' if in the form $ae^2 = 468$<br>FT 'their equation' if in the form $ae^2 = 468$ |
| (Volume = $6 \times 9 \times 12$ =) 648 ($cm^3$) | B1 | FT 'their $e$' within $24 \times e^3$ correctly evaluated |
| Look for:<br>• if units given, are they correct?<br>• notation<br>• labels and joining text<br><br>QWC2: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>**AND**<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer<br><br>QWC1: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>**OR**<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer | *If no marks, then allow SC2 for $3e \times 4e \times 2e = 468$ leading to an answer of $e = 2.69...$ or 2.7, or SC1 for sight of $3e \times 4e \times 2e = 468$ or equivalent*<br><br>QWC<br>2<br><br>9 | QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| 5. 26.5 – 26.5 ×0.12 OR 26.5 × 0.88 (=23.3(2)<br><br>23.3(2 )– 23.3(2) × 0.08 OR 23.3(2 )× 0.92<br>(= 21.4544 or 21.436)<br><br>25.3 – 21.4544 (= 3.8456) OR 25.3 – 21.436(=3.864)<br><br>3.8(….°C) to 3.9(°C) from correct working | M1<br><br>M1<br><br>m1<br><br>A1<br>4 | OR M2 for<br>$26.5 \times 0.88 \times 0.92$<br>FT 'their 23.32', but not 26.5<br><br>Depends on both previous M marks<br>FT for their 23(.32) and their 21(….)<br><br>Accept 4(°C) from correct working |
| 6. Sight of any quotient using values from the table for a/b or b/a<br>$a = 2.5 \times b$<br>$b = 0.4 \times a$ | M1<br><br>A1<br>A1<br>3 | Or sight of 1 correct response, or answers reversed<br><br>Or equivalent<br>Or equivalent<br>FT from $a = 0.4 \times b$ to give $b = 2.5 \times a$ |
| 7.(a) $5.6 \times 10^{-5}$<br>(b) $2.3 \times 10^9$ | B1<br>B1<br>2 | |

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| Methods in Mathematics<br>Unit 2 Higher Tier June 2014 | Mark | Comment |
|---|---|---|
| 8. Idea to show or use the perpendicular height in a right angled triangle | S1 | Award for statement such as '6(cm) is not the vertical height' |
| Height = sin58° × 6 | M2 | M1 for sin58° = Height/6 |
| = 5(.088…cm) | A1 | |
| Area = 5(.088… )× 10 | M1 | FT their 5(.088…cm) provided prior M1 awarded or an attempt has been made to use a trig ratio |
| = 50.9($cm^2$) or 51($cm^2$) | A1 | Must be rounded. Do not accept 50.8 or 50 (from premature approximation). FT from M1 |
| | | *If S1 only, then use of spurious perpendicular height <6, then also award SC1 for their perpendicular height ×10 correctly evaluated* |
| | | *Alternative:* |
| | | *Use of ½ absinC* *S1* |
| | | *2 × ½ × 6 × 10 × sin 58°* *M3* |
| | | *or M2 for ½ × 6 × 10 × sin 58°* |
| | | *50.9($cm^2$) or 51($cm^2$)* *A2* |
| | 6 | *or A1 for calculating ½ required area* |
| 9(a) Correct translation | B1 | |
| (b) Correct rotation | B2 | B1 near miss of grid lines, or for clockwise 90° about (-2, -1), or for anticlockwise 90° about (-1, -2) |
| (c) Correct reflection in $y = x$ | B2 | B1 for a reflection in $y = -x$,<br>OR for sight of the line $y = x$ |
| (d) Enlargement scale factor ½ | B2 | B1 for any 1 line correct, or consistent incorrect fractional scale |
| Correct position | B1<br>8 | |
| 10. 26.7 = Π× d or 26.7 = 2 × Π× r or r = 26.7/Π | M1 | |
| Diagonal = 8.495… to 8.5(0…) (cm) | A1 | Accept rounded or truncated |
| $diagonal^2 = side^2 + side^2$ | M1 | FT their diagonal |
| $side^2 = diagonal^2/2$ | A1 | |
| side length = 6(.0096…cm) | A1 | Do not FT from inappropriate truncation or incorrect rounding (e.g. from d = 8.4)<br>Answer here for A1 should round to 6.01 |
| Perimeter = 24.(….cm) | B1<br>6 | FT provided both M marks awarded for 4× 'their side length' |
| 11.(a)(i) y = x **and** y = - x indicated<br>(2 quadrants for both) | B2 | B1 for either indicated in 2 quadrants, or both indicated in 1 quadrant each<br>B1 for indication of appropriate points at least 3 in each of the 4 quadrants<br>*Ignore any circles drawn* |
| (ii) y = x and y = - x or equivalent | B2 | CAO. B1 for either equation |
| (b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ | B1<br>5 | CAO |
| 12. sin XYZ/23.8 = sin123(°)/38.9 | M1 | OR 23.8/sin XYZ = 38.9/sin123(°) |
| sin XYZ = 23.8 × sin123(°)/38.9 | M1 | OR $\sin^{-1}$ 0.513... *This M1 implies previous M1* |
| XYZ = 30.871..( °) rounded or truncated correctly | A1<br>3 | |
| 13. y = 4 – x OR x = 4 - y | M1 | OR For sight of $x^2 + xy = 4x$ |
| $2x^2 + x(4-x) - 5 = 0$ $2(4-y)^2 + (4-y)y - 5 = 0$ | M1 | OR Subtraction from 1st equation |
| $x^2 + 4x - 5 = 0$ $y^2 – 12y + 27 = 0$ | A1 | OR $x^2 + 4x = 5$ |
| (x - 1)(x+5) = 0 (y -3)(y -9) = 0 | M1 | FT provided quadratic from an appropriate substitution method or subtraction method<br>OR alternative method to solve , e.g. formula with correct substitution and $b^2$-4ac correctly simplified |
| x = 1, x = -5 OR y = 3, y =9 | A1 | |
| y = 3, y = 9 x = 1, x = -5 | A1 | |
| | | *If A0, A0 then SC1 for x= 1, y=3* ***OR*** *x= -5, y=9 provided algebraic method shown with appropriate M1, M1, M1 marks* |
| | 6 | *No marks for trial & improvement methods* |

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| Methods in Mathematics<br>Unit 2 Higher Tier June 2014 | Mark | Comment |
|---|---|---|
| 14(a) 6:2 and 7:QR or equivalent, or scale factor 7/6<br>QR = 2 × 7 ÷ 6 or equivalent<br>QR = 2.3(33…cm)<br><br>(b) AE = 4x<br>AF = 5.5 y<br>(Perimeter =) 6x + 8.5y or 6x +17y/2 ISW | B1<br>M1<br>A1<br><br>B1<br>B1<br>B1<br><br>6 | OR 6:8 and 7:**PR** or equivalent<br>OR **PR** = 7 × 8 ÷ 6 (= 9.33…) or equivalent<br><br><br><br><br>CAO. Must be simplified<br>Accept ½ (12x + 17y)<br>Answers of 4x + 5.5y + 2x + 3y imply B1, B1, B0 |
| 15. b = 45(°)<br>c = 180(°) | B1<br>B1<br>2 | |
| 16(a) **HK** = **HL** + **LK** (= 5**x** + 6**y** + 3**x** – 6**y**)<br>= 8**x** (+0**y**)<br>(b)(i) **LN** = 3**x** – 6**y** + 18**x** – 36**y** (=21**x** – 42**y**)<br>k = 7<br><br>(ii) Collinear (or lie along the same straight line) | M1<br>A1<br>M1<br>A1<br><br>B1<br>5 | <br><br><br>May be embedded. Award M1, A1 for sight of k=7<br><br>Do not accept parallel as a full description |
| 17. Area of the square base = 119.8 – 4 ×23.6<br>= 25.4(cm$^2$)<br>(Volume pyramid) 76.4 = ⅓ × 25.4 × height<br><br>height = 9.02… cm<br><br>(Volume cone) 44.4 = ⅓ × π × r$^2$ × height<br><br>r$^2$ = 44.4/(⅓ × π × height)<br><br>r$^2$ = (44.4 × ⅓ × 25.4) / (76.4 × ⅓ × π)<br>r$^2$ = 4.69… to 4.701…<br>(radius) 2.17 or 2.2 (cm) | M1<br>A1<br>m1<br><br>A1*<br><br>M1*<br><br>M1<br>A1<br><br><br><br>A1<br><br><br><br><br><br>8 | <br><br>FT their area of square base<br>Note √25.4 = 5.0398…× 5.0398…<br><br><br>Depends on all previous method marks, FT their height<br><br>FT equivalent difficulty, isolating r$^2$<br>CAO.<br>OR r$^2$ = 4.7, or an appropriate unrounded r, r = 2.1681875… to 2.17<br>CAO.<br>Appropriate degree of accuracy required<br><br>*Alternative for A1*, M1**<br>*Equating heights,*<br>76.4 / (⅓ × 25.4) = 44.4 /(⅓ × π × r$^2$)<br><br>*For information:*<br>*Common height = 9.02(cm)*<br>*Height of a triangular face = 9.37(cm)* |



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| Surname | Centre Number | Candidate Number |
|---|---|---|
| Other Names | | 0 |

# GCSE LINKED PAIR PILOT

4364/01

# METHODS OF MATHEMATICS

## UNIT 2: Methods (Calculator)
## FOUNDATION TIER

A.M. MONDAY, 20 January 2014

1 hour 30 minutes

### ADDITIONAL MATERIALS

A calculator will be required for this paper.

A ruler, a protractor and a pair of compasses may be required.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take $\pi$ as 3·14 or use the $\pi$ button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **11**.

| For Examiner's use only | | |
|---|---|---|
| **Question** | **Maximum Mark** | **Mark Awarded** |
| **1.** | **2** | |
| **2.** | **2** | |
| **3.** | **3** | |
| **4.** | **4** | |
| **5.** | **5** | |
| **6.** | **3** | |
| **7.** | **6** | |
| **8.** | **4** | |
| **9.** | **3** | |
| **10.** | **5** | |
| **11.** | **6** | |
| **12.** | **8** | |
| **13.** | **2** | |
| **14.** | **8** | |
| **15.** | **5** | |
| **16.** | **7** | |
| **17.** | **3** | |
| **18.** | **4** | |
| **Total** | **80** | |

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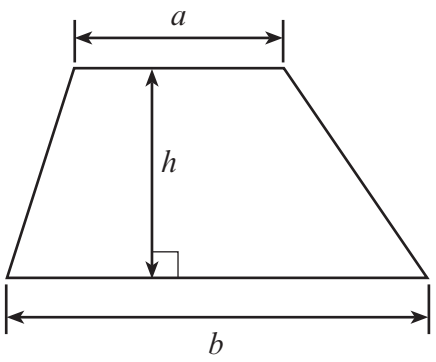
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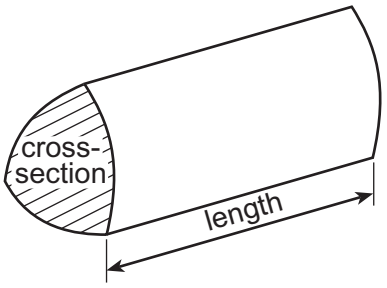
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## Formula List

**Area of trapezium** $= \frac{1}{2}(a + b)h$




**Volume of prism** = area of cross-section × length




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**1.** *(a)* Write down the **smallest** four digit number that can be made using all the digits 4, 1, 9 and 6. [1]

.....

*(b)* Write down the **largest even** four digit number that can be made using all the digits 4, 1, 9 and 6. [1]

.....

**2.** In the following list, draw a circle around each number that has the same value as $\frac{1}{4}$. [2]

**40%** **25%** **0·14** $\frac{2}{8}$ **0·4**

**3.** A chess set costs £4.99.
How much change would you get from a £20 note if you bought four of these chess sets?
You must show the units of your answer. [3]

.....

.....

.....

.....

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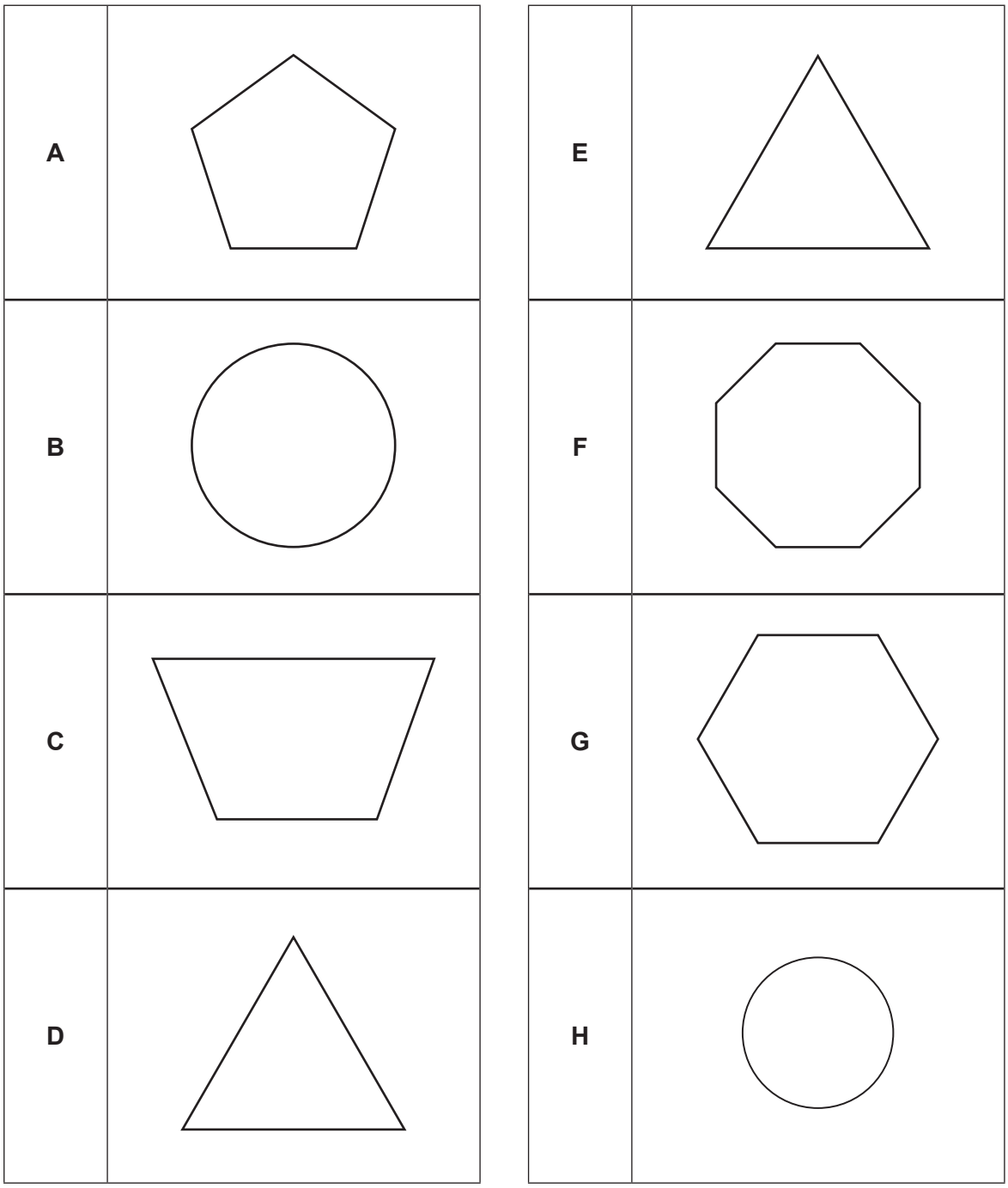
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**Turn over.**

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**4.** *(a)*




Use the diagrams above to identify and write down [2]

- a pair of congruent shapes

.....

- a pair of shapes that are similar but not congruent

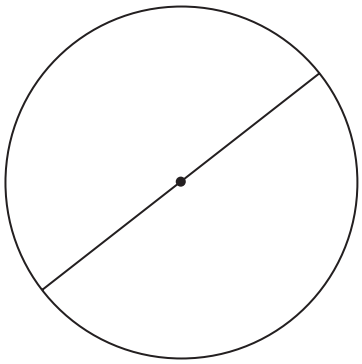
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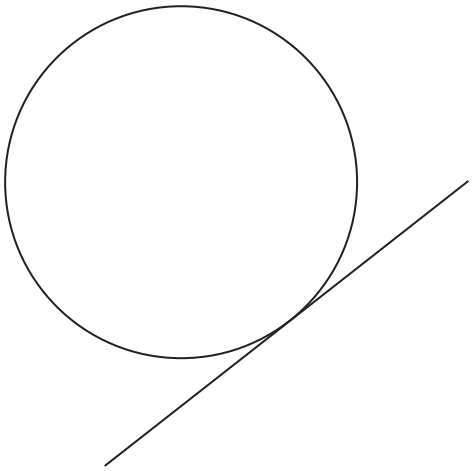
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*(b)* Write down the special name of the straight line shown in each of the following diagrams. [2]



.....



.....

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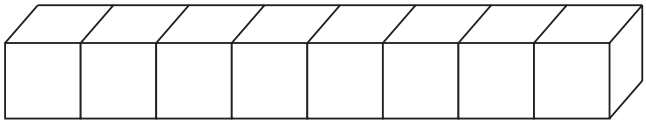


**Turn over.**

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**5.** A shape consists of a row of cubes each measuring 1 cm by 1 cm by 1 cm as shown below.



*(a)* (i) Write down the volume of this shape.
You must show the units of your answer. [2]

.....

.....

.....

(ii) Can you use all the cubes above to make a larger cube?
Explain your answer. [1]

.....

.....

*(b)* Calculate the volume of the cuboid shown below. [2]

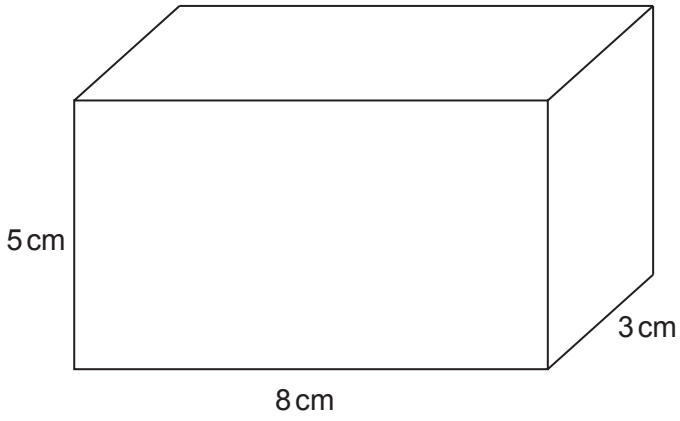



*Diagram not drawn to scale*

.....

.....

.....

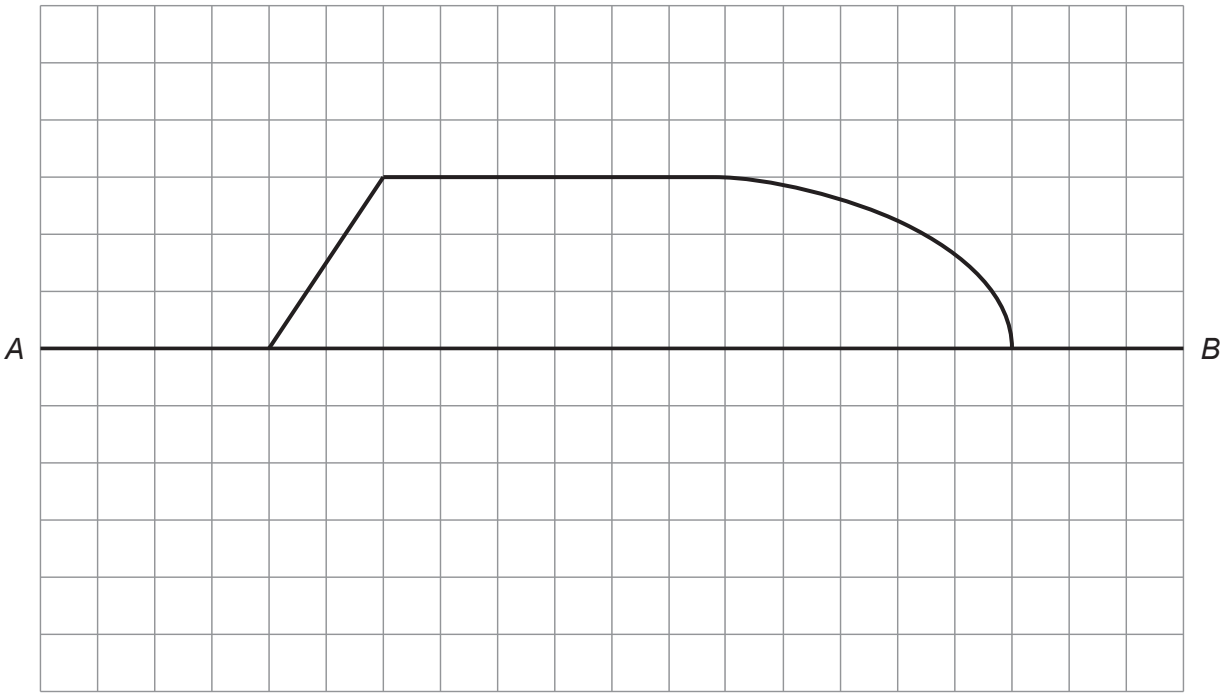
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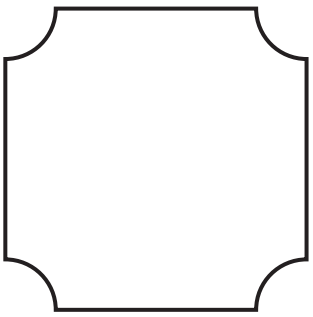
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**6.** *(a)* Complete the following diagram so that *AB* is a line of symmetry. [2]




*(b)* Write down the order of rotational symmetry of the shape below.



Order of rotational symmetry = ..... [1]

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**7.** The ingredients needed to make raspberry pancakes are shown in the table below. Some of the quantities are missing.

*(a)* Fill in the missing quantities in the table. [4]

| | **8 pancakes** | **16 pancakes** | **80 pancakes** |
|---|---|---|---|
| **Flour** | 100 g | ..... | 1000 g |
| **Eggs** | 1 | 2 | 10 |
| **Milk** | ..... | ..... | 2500 ml |
| **Melted Butter** | 1 tablespoon | 2 tablespoons | 10 tablespoons |
| **Raspberries** | 150 g | 300 g | ..... |

*(b)* Write down the ratio of the weight of flour to the weight of raspberries **in its simplest form**. [2]

.....

**Flour : Raspberries**

..... : .....

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**8.** *(a)* Find 23% of £52. [2]

.....

.....

*(b)* Find $\frac{4}{9}$ of 243. [2]

.....

.....

**9.** **Showing all your working**, write 76%, 0·7 and $\frac{3}{4}$ in descending order. [3]

.....

.....

.....

.....

.....



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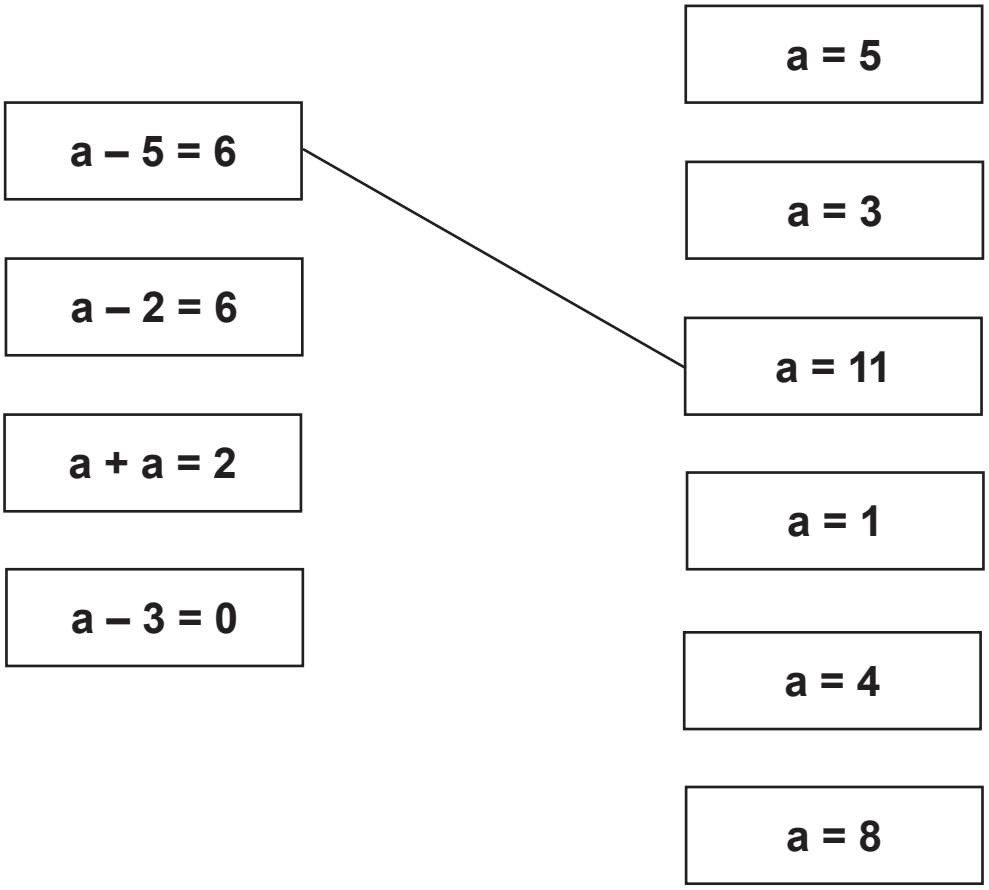


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**Turn over.**

Examiner only

**10.** *(a)* Draw a line from each of the following equations to its solution.
The first one is done for you. [3]




*(b)* Write down an equation that gives the solution $x = 10$. [1]

.....

.....

*(c)* Write down an equation that gives the solution $t = -4$. [1]

.....

.....

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**11.** *You will be assessed on the quality of your written communication in this question.*

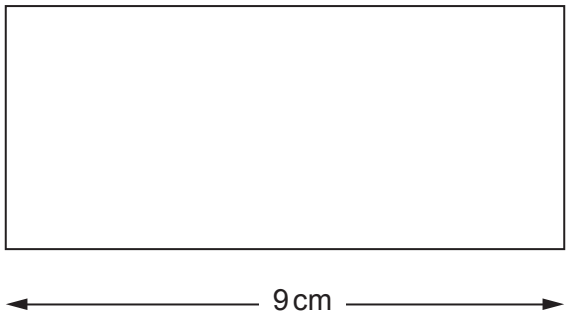



*Diagram not drawn to scale*

The area of this rectangle is 45 $cm^2$.
Calculate the perimeter of the rectangle.
You must show all your working. [6]

Examiner only

**12.** *(a)* Solve $4x = 16$. [1]

*(b)* Solve $\frac{y}{5} = 4$. [1]

*(c)* Solve $5a - 8 = 17$. [2]

*(d)* Solve $\frac{20}{b} = 5$. [1]

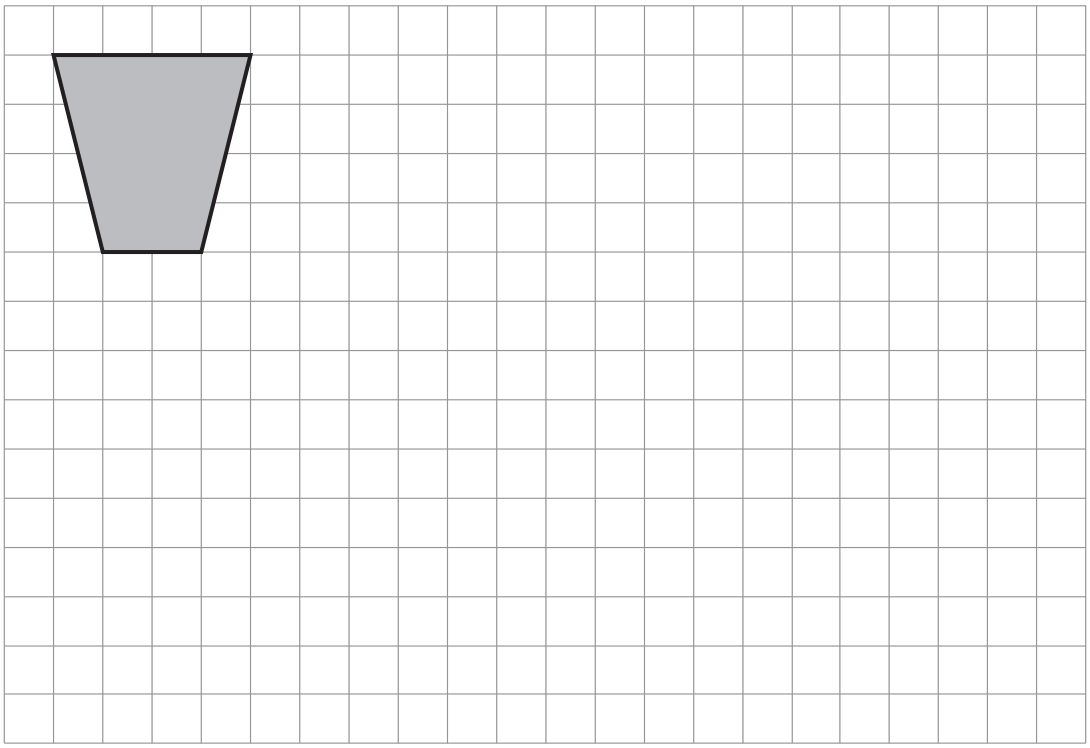
*(e)* The cost of a cup of tea is the same as the cost of a cup of coffee.
Two cups of tea and three cups of coffee cost £8 in total.
Find the cost of one cup of tea. [3]

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**13.** Enlarge the following shape by a scale factor of 2. [2]



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**14.** *(a)* Calculate the cube root of 125. [1]

*(b)* Calculate the value of 1·4 cubed. [1]

*(c)* Find the value of $\sqrt{25{\cdot}3} + 2{\cdot}3^2$ . Write down your answer to 1 significant figure. [2]

*(d)* Find the value of $\sqrt{\dfrac{3}{4{\cdot}2^2 - 3}}$ , giving your answer correct to two decimal places. [2]

*(e)* Solve the inequality $5x + 3 > 18$. [2]

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**15.** The diagram shows a right-angled triangle.

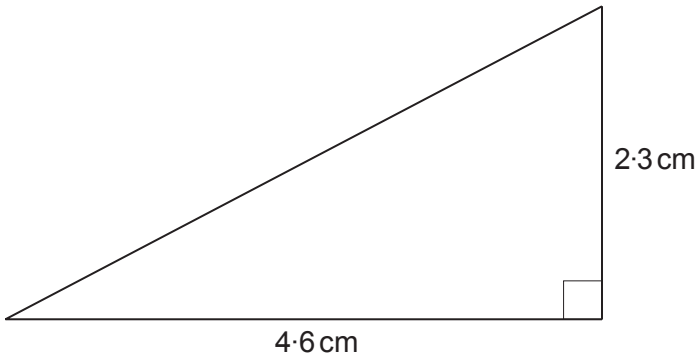



*Diagram not drawn to scale*

*(a)* Calculate the area of the right-angled triangle. [2]

*(b)* Calculate the length of the hypotenuse. [3]

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**16.** *(a)* The area of a circle is $36\pi\,\text{cm}^2$.
What is the radius of this circle? [2]

*(b)*

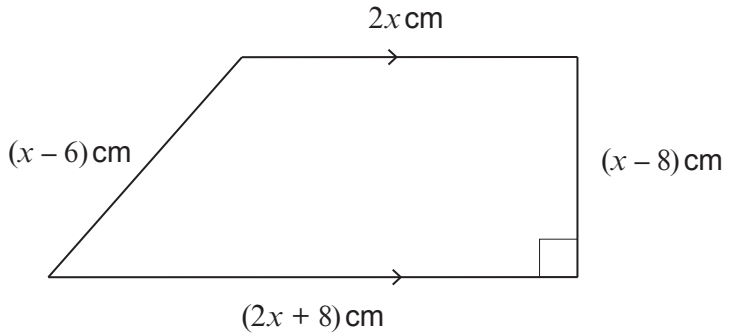



*Diagram not drawn to scale*

The **perimeter** of the trapezium is 132 cm.

Calculate the height of the trapezium.
You must show all your working. [5]

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**17.** Abbie, Beatrice, Catrin and Debbie all sat the same test.

| Name | Test results |
|---|---|
| Abbie | 23 out of 84 marks awarded |
| Beatrice | Scored approximately 31% |
| Catrin | Total given was $\frac{1}{3}$ of marks available |
| Debbie | $\frac{27}{84}$ |

Compare their test results and complete the table below.
You must show all your working. [3]

.....

.....

.....

.....

.....

.....

| Position | Name |
|---|---|
| First   | ..... |
| Second   | ..... |
| Third   | ..... |
| Fourth   | ..... |

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**18.** *(a)* An amount of money is shared by three people in the ratio 2 : 5 : 8.
What fraction of this money is given to the person who receives the smallest share? [2]

.....

.....

.....

*(b)* Percentage change can be calculated by using multipliers.

A final answer is calculated as follows:

- £400 is increased by 26%
- The increased answer is then decreased by 24%
- This gives the final answer

The calculation to work out the final answer can be expressed, using multipliers, as the **product of three numbers**.
Complete the statement below. [2]

.....

.....

.....

Final answer = £400 x ..... x .....

**END OF PAPER**

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# GCSE MARKING SCHEME

## METHODS IN MATHEMATICS
## (LINKED PAIR PILOT)

## JANUARY 2014

## INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2014 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.


| | Page |
|---|---|
| Unit 1 Foundation Tier | 1 |
| Unit 1 Higher Tier | 5 |
| Unit 2 Foundation Tier | 10 |
| Unit 2 Higher Tier | 14 |


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# METHODS UNIT 2
# FOUNDATION TIER

<table>
<tr><th>Methods Unit 2 Foundation Tier January 2014</th><th>Mark</th><th>Comments</th></tr>
<tr><td>1. (a) 1469<br>(b) 9614</td><td>B1<br>B1<br>2</td><td></td></tr>
<tr><td>2. 25% and 2/8</td><td>B2<br><br>2</td><td>B1 for 1 correct and no more than 1 incorrect<br>OR B1 for 2 correct and 1 incorrect</td></tr>
<tr><td>3. (£) 20 – 4 x (£)4.99<br>£ 0.04 or 4p</td><td>M1<br>A2<br><br>3</td><td><br>Allow £0.04p<br>A1 for 0.04 or 4 with wrong units or no units</td></tr>
<tr><td>4. (a) D and E<br>B and H<br><br>(b) Diameter<br>Tangent</td><td>B1<br>B1<br><br>B1<br>B1<br>4</td><td>Accept triangle(s)<br>Accept circle(s)</td></tr>
<tr><td>5. (a)(i) 8<br>cm³<br><br>ii) (Yes and Volume = ) 2×2×2 implied or drawn<br><br>(b) 5 × 8 × 3<br>=120 ( cm³)</td><td>B1<br>U1<br><br>B1<br><br>M1<br>A1<br>5</td><td><br>Independent of all other marks.</td></tr>
<tr><td>6. (a) Correct diagram<br><br>(b) 4</td><td>B2<br><br>B1<br>3</td><td>B1 for straight lines correct or B1 for correct curve</td></tr>
<tr><td>7. (a)
<table>
<tr><th></th><th>8 pancakes</th><th>16 pancakes</th><th>80 pancakes</th></tr>
<tr><td>Flour</td><td>100g</td><td>200(g)</td><td>1000g</td></tr>
<tr><td>Eggs</td><td>1</td><td>2</td><td>10</td></tr>
<tr><td>Milk</td><td>250(ml)</td><td>500(ml)</td><td>2500ml</td></tr>
<tr><td>Melted Butter</td><td>1 tablespoon</td><td>2 tablespoons</td><td>10 tablespoons</td></tr>
<tr><td>Raspberries</td><td>150g</td><td>300g</td><td>1500(g)</td></tr>
</table>
(b) 100 :150 or equivalent<br><br>2 : 3 ISW</td><td>B4<br><br><br><br><br><br><br><br><br><br>M1<br><br>A1<br><br>6</td><td>B1 for each correct entry<br><br><br><br><br><br><br><br><br><br>FT ‘their flour’ for 16 pancakes or ‘their raspberries’ for 80 pancakes’<br>Award SC1 for 3:2</td></tr>
</table>

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| Methods Unit 2 Foundation Tier January 2014 | Mark | Comments |
|---|---|---|
| 8. (a) 23/100 x 52<br>=(£) 11.96<br><br>(b) 4/9 x 243<br>= 108 | M1<br>A1<br><br>M1<br>A1<br><br>4 | |
| 9. For 2 correct in a form which allows comparison<br>For all 3 correct in a form which allows comparison<br>76%, ¾ , 0.7 | B1<br><br>B1<br><br>B1<br>3 | |
| 10.(a) a=8<br>a=1<br>a=3<br>(b) Equation with answer x=10<br>Equation with answer t =-4 | B1<br>B1<br>B1<br>B1<br>B1<br>5 | |
| 11.(Width of rectangle=) 45 / 9<br>= 5cm<br>(Perimeter=) 9 + 5 + 9 +5<br>=28cm<br><br>Look for:<br>Area = length x width<br>Explanation of perimeter<br>Correct use of Units<br><br>QWC2: Candidates will be expected to<br>• present relevant work clearly, with words explaining process or steps<br>AND<br>• make few if any mistakes in spelling, punctuation and grammar<br><br>QWC1: Candidates will be expected to<br>• present work clearly which is mostly relevant, with words explaining process or steps<br>OR<br>make few if any mistakes in spelling, punctuation and grammar and include units in their final answer | M1<br>A1<br>M1<br>A1<br>4<br><br><br><br><br><br>QWC<br>2<br><br><br><br><br><br><br><br><br><br><br><br>6 | FT 'their width'<br><br><br><br><br><br><br>QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| 12.<br>(a) $x$=4<br>(b) $y$ = 20<br>(c) 5a = 17 +8<br>a = 5<br><br>(d) b = 4<br>(e) 5d=8<br>(d=) 8/5<br>£1.6(0) | <br>B1<br>B1<br>B1<br>B1<br><br>B1<br>B1<br>M1<br>A1<br>8 | Allow embedded answers in all parts<br><br><br><br>FT from 1 error for equation in the form ma=n, m≠1<br><br><br>OR realising 5 drinks cost £8 |

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| Methods Unit 2 Foundation Tier January 2014 | Mark | Comments |
|---|---|---|
| 13. Enlargement scale factor 2 | B2<br>2 | B1 for any two lines correct or 3 points correct |
| 14. (a) 5<br>(b) 2.744<br>(c) 10<br>(d) 0.45<br>(e) 5x>15<br>x>3 | B1<br>B1<br>B2<br>B2<br>M1<br>A1<br>8 | <br><br>B1 for 10.3(199… )<br>B1 for 0.45267… rounded or truncated<br><br>CAO |
| 15 (a) ½ × 4.6 × 2.3<br>5.29 ($cm^2$) or 5.3($cm^2$)<br>(b) (hypotenuse$^2$ =) $4.6^2 + 2.3^2$<br>h(ypotenuse)$^2$ = 26.45 or hypotenuse = √26.45<br>h(ypotenuse =) 5(.14… cm) | M1<br>A1<br>M1<br>A1<br>A1<br>5 | <br>Only accept 5($cm^2$) from correct working<br><br><br>Allow FT from M1, A0 |
| 16.(a) $\pi r^2 = 36\pi$<br>6 (cm)<br><br><br>(b) (Perimeter) 2x + x – 6 + 2x + 8 + x – 8<br>= 132<br><br>6x - 6 = 132 or 6x = 138<br>x = 23<br>(Height of the trapezium (x – 8)cm =) 15 (cm) | M1<br>A1<br><br><br><br>M1<br>M1<br><br>A1<br>A1<br>B1<br><br><br><br><br><br><br><br>7 | For equating, or r = √36, or $r^2$ = 36<br>*If no marks allow SC1 for 5.9(9..cm) from calculation*<br><br>Algebraic notation not required for M, A and B marks<br><br>FT their sum of terms, including x and number terms, equated to 132<br>FT their collection for equivalent difficulty<br>FT for evaluation, not left as a fraction<br>FT their x-8 provided M2 awarded<br><br>*Alternative: Trial and improvement*<br>*M1 Trial to sum the correct 4 sides*<br>*M1 Clearly working towards 132, more than 1 trial and moving closer*<br>*A1 Clearly working towards 132, one below and one above*<br>*A1 23*<br>*B1 (Height) 15(cm) FT their x-8provided M2 awarded* |
| 17.<br>Position \| Name<br>1 \| Catrin 33(.33...)%<br>2 \| Debbie 32(.144…)%<br>3 \| Beatrice 31%<br>4 \| Abbie 27(.38…)% | B3<br><br><br><br><br><br><br><br><br><br><br><br>3 | Names in the correct order **and** all results appropriately and correctly compared (same form)<br><br>B2 for at least 3 results correctly in a suitable format to compare **and** their comparisons appropriately sorted<br>B1 for at least 2 results correctly in a suitable format to compare **and** their comparisons appropriately sorted, OR<br>B1 for at least 3 results correctly in a suitable format to compare<br>*Remember: format of 1 of the result with 2 others to compare counts as 3 results*<br><br>*If no other marks, then award SC1 for names in the correct order*<br><br>If fractions used for comparison they need to be common denominators or awareness of size, e.g. 1/3 =9/27 compared with 9/28 same numerator<br>Fractions:<br>Catrin 28/84, Debbie 27/84 (=9/28), Beatrice ≈26/84, Abbie 23/84<br>Marks:<br>Catrin 28, Debbie 27, Beatrice ≈26, Abbie 23 |

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| Methods Unit 2 Foundation Tier January 2014 | Mark | Comments |
|---|---|---|
| 18.(a) 2/15 ISW | B2 | B1 for sight of 15, e.g. …/15 or $\frac{2}{2+5+8}$ |
| (b) (£400 × ) 1.26 (×) 0.76 or equivalent, in either order | B2 | B1 for sight of either 1.26 or 126/100<br>OR for 0.76 or 76/100<br>If no marks SC1 for sight of 383.04 |
| | 4 | |

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# METHODS UNIT 2
# HIGHER TIER

| Methods Unit 2 Higher Tier January 2014 | Mark | Comment |
|---|---|---|
| 1.(a) 20<br>(b) $12x - 39 = 45$ OR $4x - 13 = 45/3$<br>$12x = 84$ OR $4x = 28$<br>$x = 7$<br>(c) $x + 4 = 6 \times 12$<br>$x = 68$ | B1<br>B1<br>B1<br>B1<br>M1<br>A1<br>6 | FT until 2nd error<br><br><br>Or $x/12 = 6 - 4/12$ |
| 2. 0.45 | B2<br>2 | B1 for 0.45267… rounded or truncated |
| 3.(a)<br>Kite 1 1<br>Parallelogram 0 2<br>Rhombus 2 2<br><br>(b) $\pi r^2 = 36\pi$<br>6 (cm) | B3<br><br><br><br>M1<br>A1<br>5 | B2 for any 4 or 5 correct entries,<br>B1 for any 2 or 3 correct entries<br>Allow '0' in top right hand cell<br><br>For equating, or $r = \sqrt{36}$, or $r^2 = 36$<br>*If no marks allow SC1 for 5.9(9..cm) from calculation* |
| 4.<br>Position 1: Catrin 33(.33...)%<br>Position 2: Debbie 32(.144…)%<br>Position 3: Beatrice 31%<br>Position 4: Abbie 27(.38…)% | B3<br><br><br><br><br><br><br><br><br><br>3 | Names in the correct order **and** all results appropriately and correctly compared (same form)<br><br>B2 for at least 3 results correctly in a suitable format to compare **and** their comparisons appropriately sorted<br>B1 for at least 2 results correctly in a suitable format to compare **and** their comparisons appropriately sorted, OR<br>B1 for at least 3 results correctly in a suitable format to compare<br>*Remember: format of 1 of the result with 2 others to compare counts as 3 results*<br><br>*If no other marks, then award SC1 for names in the correct order*<br><br>If fractions used for comparison they need to be common denominators or awareness of size, e.g. 1/3 =9/27 compared with 9/28 same numerator<br>Fractions:<br>Catrin 28/84, Debbie 27/84 (=9/28), Beatrice ≈26/84, Abbie 23/84<br>Marks:<br>Catrin 28, Debbie 27, Beatrice ≈26, Abbie 23 |
| 5.(a) 2/15 ISW<br><br>(b) (£400 × ) 1.26 (×) 0.76 or equivalent, in either order<br><br>(c)(i) 2/5 × 1 ¼ or 15min per 5cm or 5cm in 15 min or 1cm in 3 min<br>½ (hour) or 30 (minutes)<br><br>(ii) 20/75 or 3min per 1cm or 5cm in 15 min or 1cm in 3 min<br><br>25 × 20/75 or 0.266... × 25 or 6.66.... or 20/3 or (⅓ or)0.33..cm in 1 min or 3.33.. cm in 10 min<br><br>6.67 (cm) | B2<br><br>B2<br><br><br><br>M1<br><br>A1<br><br>B1<br><br>B1<br><br><br><br>B1<br>9 | B1 for sight of 15, e.g. …/15 or $\frac{2}{2+5+8}$<br><br>B1 for sight of either 1.26 or 126/100<br>OR for 0.76 or 76/100<br>If no marks SC1 for sight of 383.04<br><br>Do not accept 2/5 × 1.15, recording of time must be correct<br><br>If units are given they must be correct<br><br>FT from (c)(i)<br><br><br><br><br>FT their depth corrected to 3 significant figures |

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| Methods Unit 2 Higher Tier January 2014 | Mark | Comment |
|---|---|---|
| 6.<br>(Perimeter) $2x + x - 6 + 2x + 8 + x - 8$<br>$= 132$<br><br>$6x - 6 = 132$ or $6x = 138$<br>$x = 23$<br>(Height of the trapezium $(x - 8)$cm =) 15 (cm)<br><br>Look for<br>• the use of notation (watch for the use of '=' being appropriate)<br>• steps shown, not $6x = 636/6$<br>• labels given 'perimeter', 'height'<br>• (*in trial and improvement, the trials and choices need to be clearly explained*)<br><br>QWC2: Candidates will be expected to<br>• present work clearly, with words explaining start, process or steps<br>AND<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer<br><br>QWC1: Candidates will be expected to<br>• present work clearly, with words explaining start, process or steps<br>OR<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer | <br>M1<br>M1<br><br>A1<br>A1<br>B1<br><br><br><br><br><br><br><br><br><br>Q<br>W<br>C<br>2<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>7 | Algebraic notation not required for M, A and B marks<br><br>FT their sum of terms, including x and number terms, equated to 132<br>FT their collection for equivalent difficulty<br>FT for evaluation, not left as a fraction<br>FT their x-8 provided M2 awarded<br><br>*Alternative: Trial and improvement*<br>*M1 Trial to sum the correct 4 sides*<br>*M1 Clearly working towards 132, more than 1 trial and moving closer*<br>*A1 Clearly working towards 132, one below and one above*<br>*A1 23*<br>*B1 (Height) 15(cm) FT their x-8provided M2 awarded*<br><br><br><br><br><br><br><br>QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| 7.(a) $b = 2c$ OR $c = \frac{1}{2} b$ ISW<br><br>(b) $5n + 7 < 52$<br>$5n < 45$ OR $n < 45/5$<br>$n < 9$ | B1<br><br>B1<br>B1<br>B1<br>4 | <br><br>Do not accept use of '=' in (b)<br>FT from 1 error<br>FT only for a whole number answer |
| 8.(a) Correct rotation<br>(b) Correct enlargement (scale factor 2) in lower left quadrant<br>Correct position | B2<br>B1<br><br>B1<br>4 | B1 for a near miss or for 90° anticlockwise rotation<br><br><br>appropriate FT to lower left quadrant |
| 9.(a) Semi C = $\frac{1}{2} \times \pi \times 6.2$<br>$+ 6.2$<br>15.9(cm) to 15.94(…cm)<br><br><br><br>(b) Volume = $\pi \times 4.5^2 \times 10.3$<br>654.9(...) to 655.5(4…)<br>$cm^3$ | M1<br>m1<br>A1<br><br><br><br>M1<br>A1<br>U1<br>6 | <br><br>Accept 16(cm) from correct working<br>For answer of 9.7(...) allow M1 and SC1<br>If no marks SC1 for sight 19.4(7...) to 19.4(8...) or 25.6(7...) to 25.6(8...)<br><br><br>Independent mark |

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| Methods Unit 2 Higher Tier January 2014 | Mark | Comment |
|---|---|---|
| 10(a) ½ × 4.6 × 2.3<br>5.29 ($cm^2$) or 5.3($cm^2$)<br>(b) (hypotenuse$^2$ =) $4.6^2 + 2.3^2$<br>h(ypotenuse)$^2$ = 26.45 or hypotenuse = √26.45<br>h(ypotenuse =) 5(.14… cm) | M1<br>A1<br>M1<br>A1<br>A1<br>5 | <br>Only accept 5($cm^2$) from correct working<br><br><br>Allow FT from M1, A0 |
| 11.(a) x = $4.5 \times 10^6 \times 3.4 \times 10^{-2}$<br>$= 1.5 \times 10^5$<br>(b) y = $1.2 \times 10^8 - 5.5 \times 10^6$<br>$= 1.1 \times 10^8$ | M1<br>A2<br>M1<br>A2<br>6 | Intention to multiply<br>A1 for $15.3 \times 10^4$ or $1.53 \times 10^5$ or equivalent including to 2 sig. figs.<br>Intention to subtract in the correct order<br>A1 for $1.145 \times 10^8$ or 0.11..×$10^9$ or 11.4…×$10^7$ (attempt standard form) or equivalent including to 2 sig. figs. |
| 12.(a) PQ = 5.6 × 5.88 / 8.4 or equivalent<br>3.92(cm)<br>(b) BC = 2.24 ÷ (5.88 / 8.4) or equivalent<br>3.2(cm) | M1<br>A1<br>M1<br>A1<br>4 | Or equivalent calculation that could lead to correct answer<br>Accept 3.9(cm)<br>FT premature approximation of the scale factor or equivalent premature approximation<br>Or equivalent calculation that could lead to correct answer<br><br>*(Alternative: scale factors 0.7 or 10/7 may be used)* |
| 13. Third angle 40(°) or 68(°)<br>Statement that this implies similar<br>Statement 'sides could be different' clearly implies not necessarily congruent | B1<br>E1<br>E1<br>3 | <br>Depends on the B1<br>Accept 'Thomas is correct because sides may be different'. Award this E1 without previous B1 and E1. |
| 14. Rearrange of equation(s) to format that could lead to a solution<br>Method to find first variable, e.g. equal coefficients, equating a variable to give equation in 1 variable<br>First variable<br>Method to find second variable, e.g. substitution shown for first variable<br>Second variable | M1<br>M1<br>A1<br>m1<br>A1<br>5 | e.g. 3x + 2y = 1 with 2x - 5y = -50, or making either x or y the subject<br>FT from 1 error in rearrangement only<br>Allow 1 error, but not in non equate variable<br><br>FT their first variable<br>**x = -5 and y = 8** |
| 15. - (3**x** + 7**y**) + 4**x** + 2**y**<br>= **x** – 5**y** | M1<br>A1<br>2 | Allow for intention of using -**OA** + **OB**, e.g. -3**x**+7**y**+4**x**+2**y** or **x** + 9**y**<br>Accept 1**x** – 5**y** |
| 16.(a) Statement C selected<br>Reason, e.g. 'inverse implies the nature is opposite'<br>(b) f α $1/g^2$ OR f = $k/g^2$<br>4 = $k/5^2$<br>f = $100/g^2$<br>(c)<br>g: 1/2, 5, **(±)100**<br>f: **400**, 4, 0.01 | B1<br>E1<br>B1<br>M1<br>A1<br>B2<br>7 | <br>Accept numerical examples<br>Do not accept a repeat of the statement given<br><br>FT non linear only<br>Maybe implied in part (b)<br><br>FT their non linear expression<br>B1 for each value |
| 17. BC = 8.6/cos15<br>BC = 8.9(03375….)<br>Tan AĈB = 3.8/BC<br>AĈB = $\tan^{-1}$0.4268…<br>23(.113…°) | M2<br>A1<br>M1<br>M1<br>A1<br>6 | M1 for cos 15 = 8.6/BC<br><br>FT their BC provided not 8.6 or 3.8<br>OR alternative using AC, following evaluation of AC using Pythagoras' Theorem |

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| Methods Unit 2 Higher Tier January 2014 | Mark | Comment |
|---|---|---|
| 18. $\frac{x}{x+y} = \frac{z}{AC}$ or $\frac{x}{x+y} = \frac{z}{z+BC}$<br>$AC = \frac{z(x+y)}{x}$ or $x(z+BC) = z(x+y)$<br>$BC = \frac{z(x+y)}{x} - z$ or $xz + xBC = xz + yz$<br>$BC = \frac{xz+yz}{x} - z$ or $x\,BC = yz$<br>$BC = yz/x$ | M1<br><br>m1<br><br>M1<br><br>M1<br><br>A1<br><br>5 | Or alternative correct first step<br><br>Rearranged in form 'AC= …'<br><br>FT BC = AC – z provided AC in terms of x, y or z<br><br>Or alternative correct stage of manipulation<br><br>CAO<br>*If no marks then SC2 for BC=yz/x without working, OR SC1 for BC/y = z/x or BC/z=y/x or equivalent* |
| 19. General cosine curve with appropriate orientation and position<br>1 and -1 indicated on y-axis, passes through (0°, 1), (90°,0), (-90°,0) and approximately (-180°,-1) and (180°,-1)<br>General tan curves with appropriate orientation and position<br>Correct indication or use of asymptotes | M1<br><br>A1<br><br><br>M1<br><br>A1<br>4 | <br><br><br><br><br><br>*If no marks, SC1 for slight error in 'tends to infinity' or idea of 'the shape of tanx'* |
| 20. Use of area = ½ absinC and cosine rule<br>$½ \times 3.9 \times x \times \sin 96° = 22.8$<br>$x = 22.8/(½ \times 3.9 \times \sin 96°)$<br>x = 11.7567…(cm) rounded or truncated<br>(longest side y) $y^2 = 3.9^2 + x^2 - 2\times3.9\times x\times\cos96°$<br>$y^2$ accept values between 163 and 164.1<br>y = 12.8 (cm) | S1<br>M1<br>A1<br>A1<br>M1<br>A1<br>A1<br>7 | <br><br>Correct rearrangement<br><br>FT their x, not 3.9 or spurious value<br><br>Accept 13(cm) from correct working, not scale diagram<br>Final A1 depends on previous A1 |



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| Surname | Centre Number | Candidate Number |
|---|---|---|
| Other Names | | 0 |

# GCSE LINKED PAIR PILOT

4364/01

# METHODS IN MATHEMATICS

## UNIT 2: Methods (Calculator)
## FOUNDATION TIER

A.M. MONDAY, 17 June 2013

$1\frac{1}{2}$ hours

### ADDITIONAL MATERIALS

A calculator will be required for this paper.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take $\pi$ as 3·14 or use the $\pi$ button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **4**.

| For Examiner's use only | | |
|---|---|---|
| **Question** | **Maximum Mark** | **Mark Awarded** |
| **1** | **8** | |
| **2** | **5** | |
| **3** | **8** | |
| **4** | **9** | |
| **5** | **4** | |
| **6** | **4** | |
| **7** | **4** | |
| **8** | **6** | |
| **9** | **9** | |
| **10** | **5** | |
| **11** | **8** | |
| **12** | **5** | |
| **13** | **5** | |
| **TOTAL MARK** | | |

4364 010001

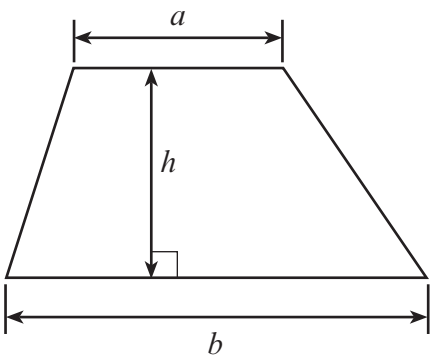
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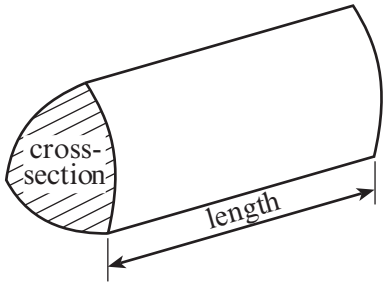
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## Formula List

**Area of trapezium** = $\frac{1}{2}(a + b)h$




**Volume of prism** = area of cross-section × length

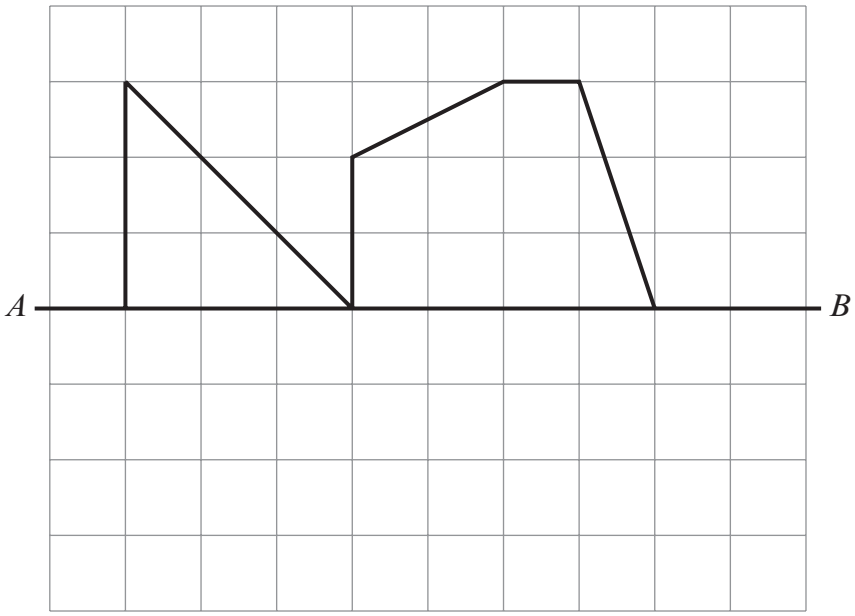



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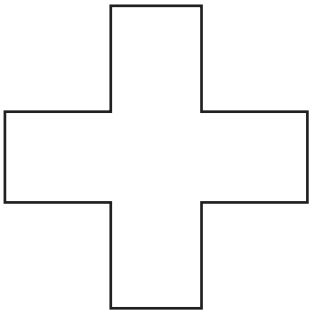
Examiner only

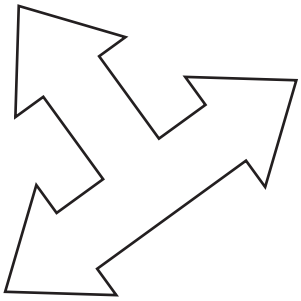
**1.** *(a)* Complete the following diagram so that $AB$ is a line of symmetry.




[2]

*(b)* Draw the lines of symmetry on each of the shapes below.

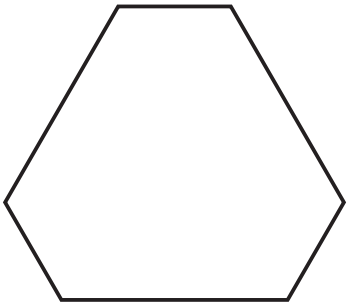


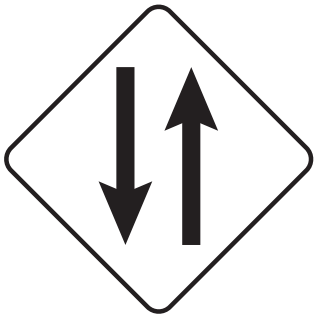


[3]

*(c)* Write down the order of rotational symmetry of each of the following shapes.







..... ..... .....

[3]

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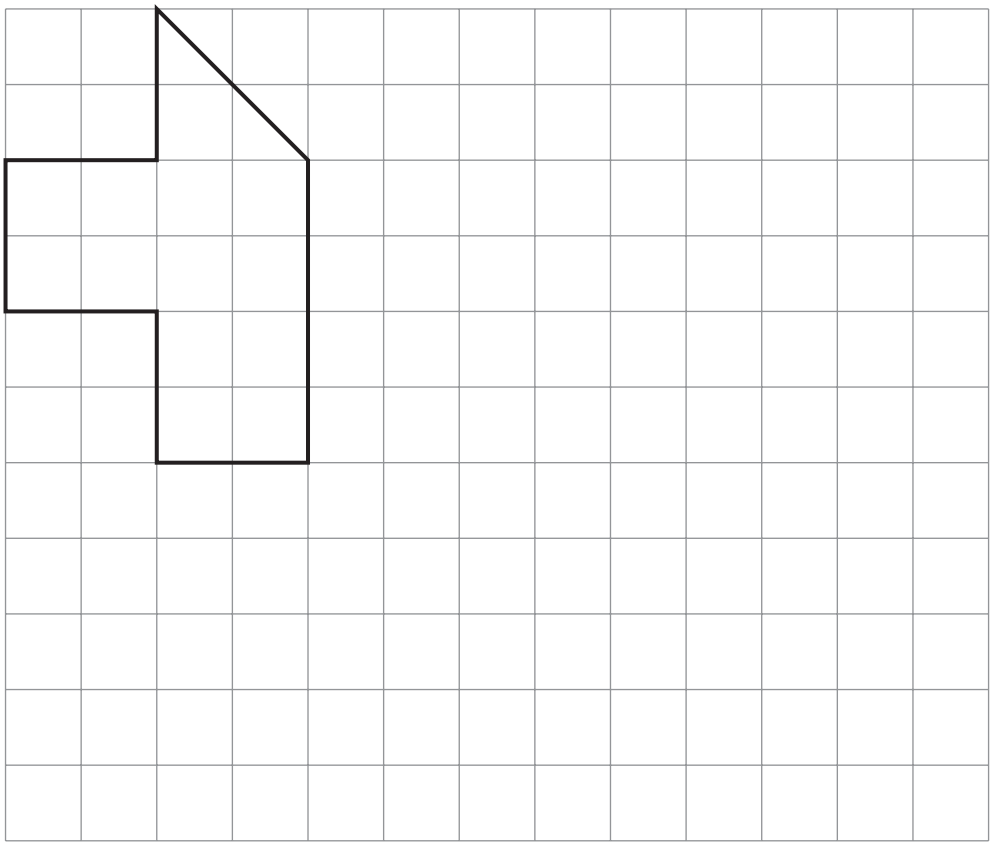
**Turn over.**

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4364 010003

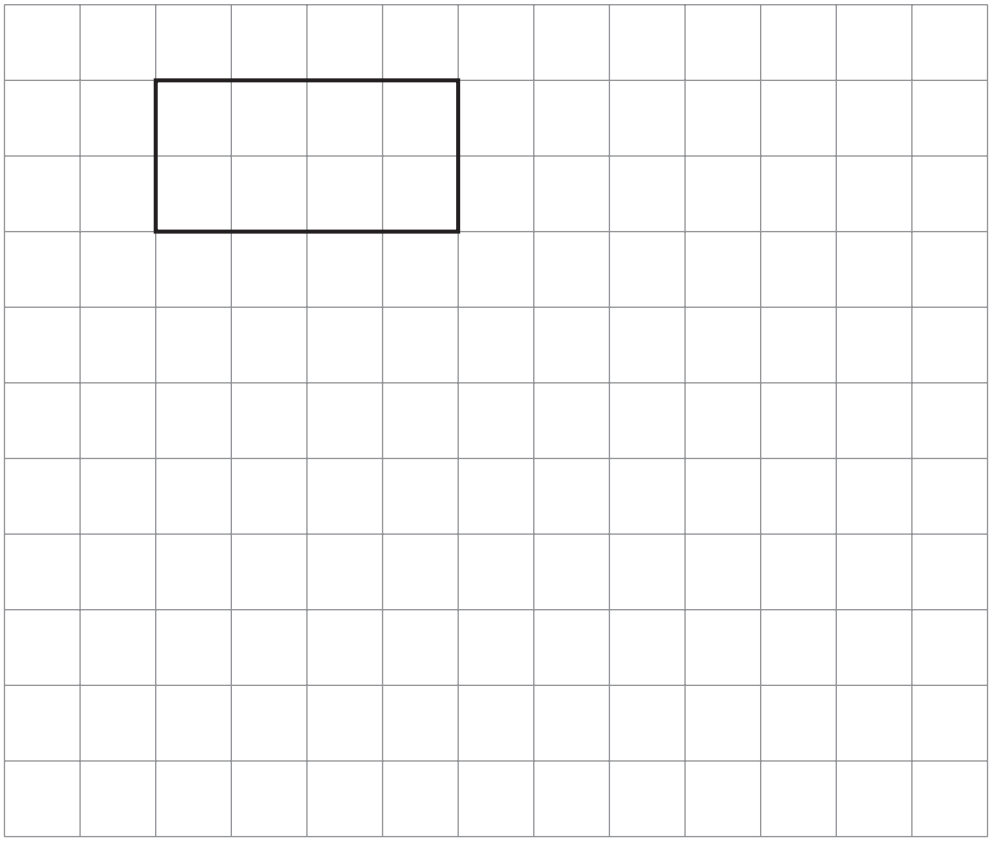
**2.** *(a)* Draw a shape congruent to the one given below.

Examiner only



[1]

*(b)* Draw a shape similar, but not congruent, to the one given below.



[1]

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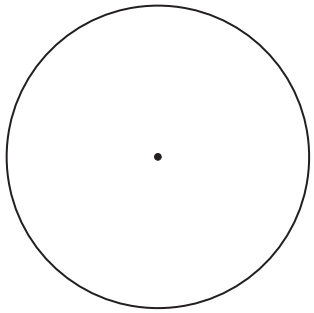
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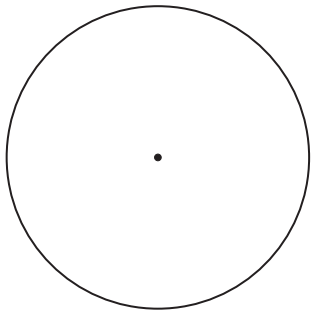
*(c)* On the following diagrams draw:

- a radius of a circle;
- a tangent of a circle;
- an arc of a circle.

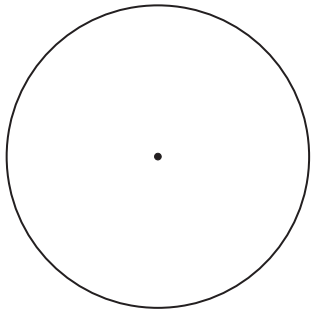
Radius



Tangent



Arc



[3]



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**3.** *(a)* Complete the following table to show equivalent fractions, decimals and percentages.

| Fraction | Decimal | Percentage |
|---|---|---|
| | 0·75 | |
| $\frac{3}{10}$ | | |

[4]

*(b)* Find 42% of 630.

.....

.....

.....

[2]

*(c)* Find $\frac{3}{7}$ of 364.

.....

.....

.....

[2]

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**4.** *You will be assessed on the quality of your written communication in this question.*



A carpenter listed the number of hours he worked in one week as:

- 40 hours Monday to Friday
- 8 hours Saturday
- 6 hours Sunday

The carpenter was paid £12.85 per hour from Monday to Friday, double time on Saturday and triple time on Sunday.

Calculate the amount of money the carpenter earned in this particular week.
You must show all your working.

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[9]



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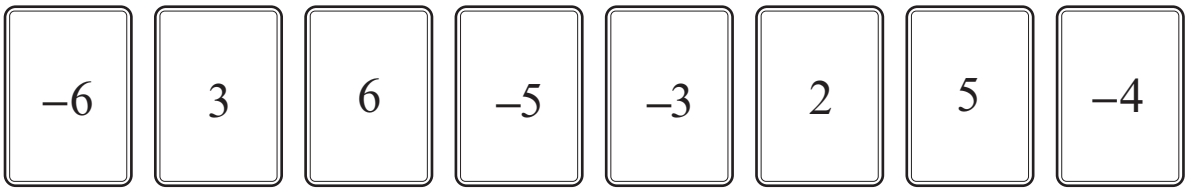


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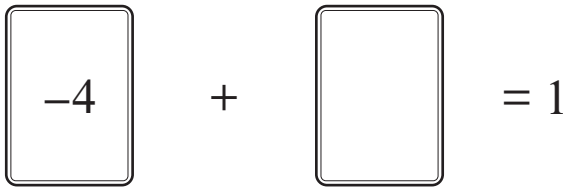
Examiner only

**5.**

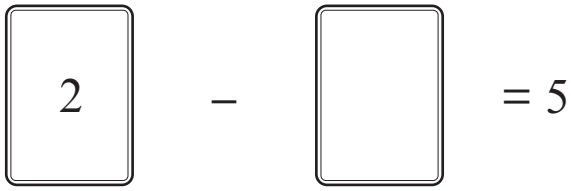



Using the cards above,

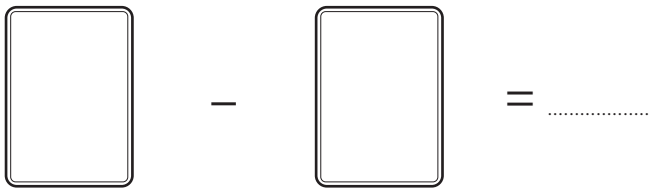
choose one card to give the answer 1,




choose one card to give the answer 5,




Choose two cards to give the largest possible answer and write down this answer.




.....

[4]

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**6.** Solve each of the following equations.

*(a)* $x - 4 = 3$

.....

.....

[1]

*(b)* $4x = 36$

.....

.....

[1]

*(c)* $5x - 4 = 31$

.....

.....

.....

.....

.....

[2]

4364 010009



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**7.** The area of a rectangle is $30\,cm^2$.
Its length and width are **whole numbers**.
Find the smallest possible perimeter of this rectangle.

Perimeter = ..... cm

[4]

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**8.** *(a)* Use equivalent fractions, with a common denominator, to write $\frac{3}{4}$, $\frac{7}{12}$, $\frac{5}{6}$ and $\frac{2}{3}$ in order with the **smallest** first.
**You must show all your working.**

[3]

*(b)* In a school $\frac{3}{5}$ of the pupils are girls.
There are 390 girls in the school.
Calculate the total number of pupils in the school.

[3]

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**9.** *(a)* Karen measured one of her paces as 0·8 m.
Her bedroom is rectangular and measures 7 paces long and 5 paces wide.
What is the area of Karen's bedroom? You must state the units of your answer.

.....

.....

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[5]

*(b)* A cuboid with length 45 cm, width 20 cm and height 35 cm is completely filled with water.
The water is then poured into a larger cuboid with length 100 cm and width 15 cm.
Showing all your working, calculate the height of the water in the larger cuboid.

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[4]

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**10.** *(a)* In an election Stella gained 28 416 votes out of a total of 38 400 votes.
Write 28 416 as a percentage of 38 400.

.....

.....

.....

[2]

*(b)* Jake needs to find a selling price which is 12% more than £766.
Find the selling price.

.....

.....

.....

[2]

*(c)* Cheryl and her sister share an amount of money in the ratio 2 : 3 respectively.
What fraction of the money will Cheryl receive?

.....

.....

[1]

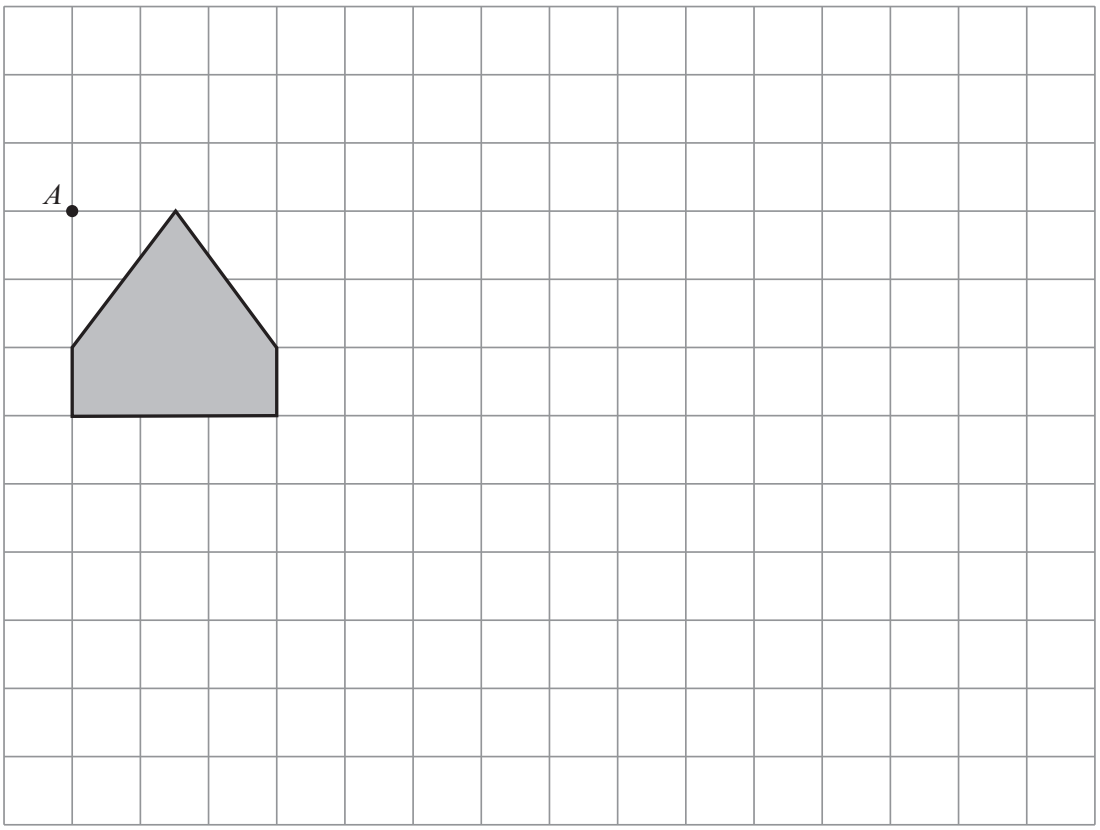
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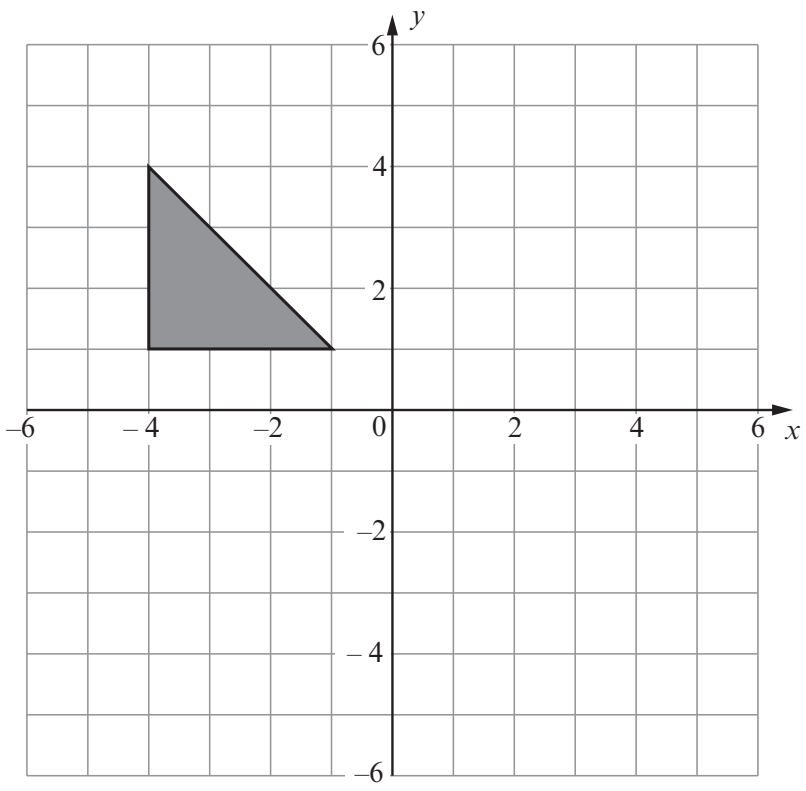
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**11.** *(a)* Enlarge the shape shown on the grid by a scale factor of 2 using $A$ as the centre of the enlargement.




[3]

*(b)* Reflect the triangle in the line $y = x$.



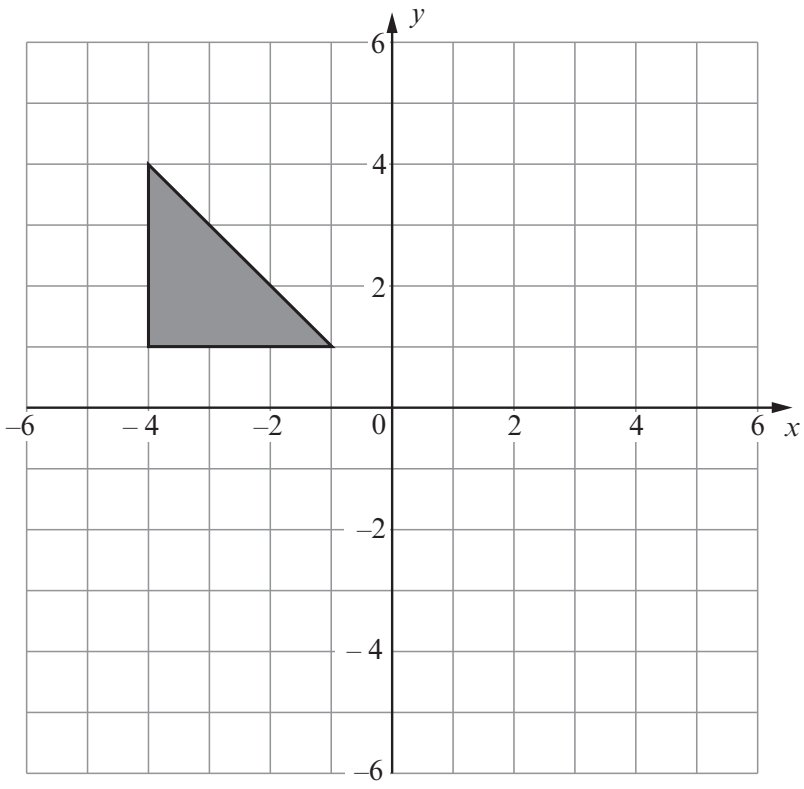

[2]

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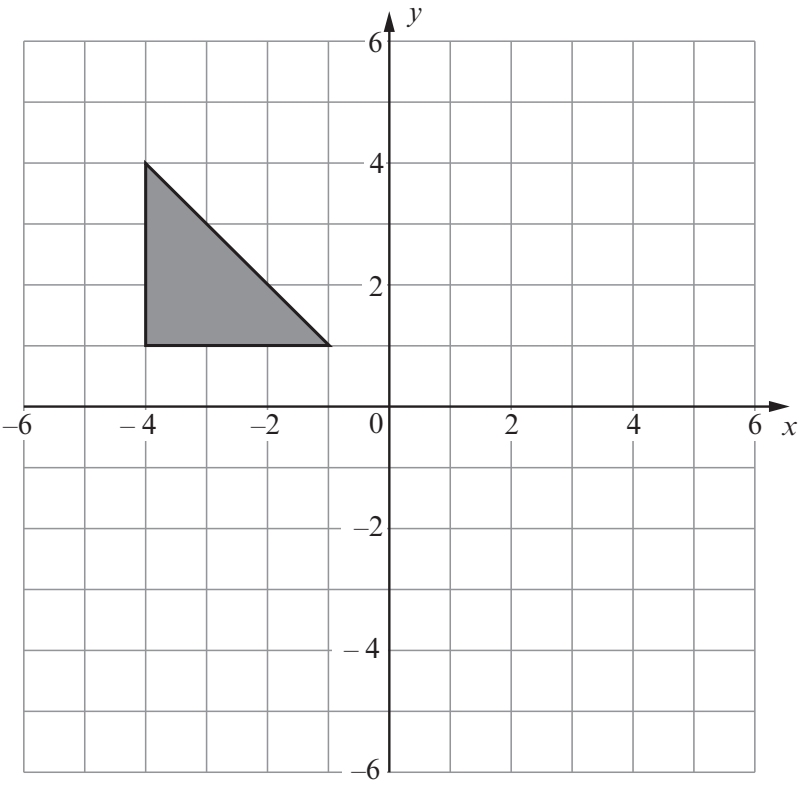
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*(c)* Translate the triangle shown below by $\begin{pmatrix} 5 \\ -3 \end{pmatrix}$.




[1]

*(d)* Rotate the triangle shown on the grid below through 90° anticlockwise about (2, 1).




[2]

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**Turn over.**

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**12.** *(a)* Solve $9x - 4 = 7(x + 2)$.

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[3]

*(b)* Solve the inequality $10x + 5 > 45$.

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[2]

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**13.** *(a)*

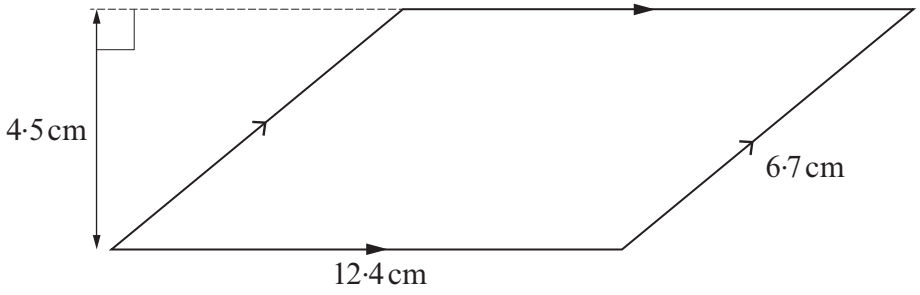



*Diagram not drawn to scale*

Calculate the area of the parallelogram.

.....

.....

.....

[2]

*(b)* The lengths, in centimetres, of the five sides of a pentagon are:

$x$ $\quad$ $x + 2$ $\quad$ $2x$ $\quad$ $3x + 5$ $\quad$ $4x$

The perimeter of the pentagon is 95 centimetres.
Set up an equation in terms of $x$ and solve it to find the value of $x$.

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.....

$x =$ .....

[3]

**END OF PAPER**

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# GCSE MARKING SCHEME

## METHODS OF MATHEMATICS (LINKED PAIR PILOT)

## SUMMER 2013

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## INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2013 examination in GCSE METHODS OF MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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# UNIT 2 (FOUNDATION TIER)

<table>
<tr><th>Methods 2 Foundation June 2013</th><th></th><th>Final</th></tr>
<tr><td>1. (a) Correct diagram<br>(b) 4 lines of symmetry drawn correctly<br>Only 1 line of symmetry drawn correctly<br>(c) 4, 3, 2</td><td>B2<br>B2<br>B1<br>B3<br>8</td><td>-1 for each incorrect vertex<br>Award B1 for 2 or 3 lines of symmetry correctly drawn<br>CAO<br>Award B1 for each correct one</td></tr>
<tr><td>2. (a) A correct congruent shape drawn<br>(b) A correct similar shape drawn<br>(c) Radius drawn<br>Tangent drawn<br>Arc drawn</td><td>B1<br>B1<br>B3<br><br><br>5</td><td><br>Do not accept a congruent shape<br>B1 for each correct. Accept intention of each</td></tr>
<tr><td>3. (a)<br><table><tr><td>¾</td><td></td><td>75(%)</td></tr><tr><td></td><td>0.3(0)</td><td>30(%)</td></tr></table><br>(b) 42/100 × 630<br>264.6(0)<br>(c) 3/7 × 364<br>156</td><td>B2<br><br>B2<br><br><br>M1<br>A1<br>M1<br>A1<br>8</td><td>Accept equivalent fractions for ¾ . Ignore incorrect simplification of 75/100. Do not accept 7.5/10.<br><br><br><br><br>CAO<br>Or equivalent<br>CAO</td></tr>
<tr><td>4. (Monday to Friday) 40 × (£)12.85<br>= (£)514<br>(Saturday) 8 × (12.85 × 2)<br>= (£)205.6(0)<br>(Sunday) 6 × (12.85 × 3)<br>= (£)231.3(0)<br>(Total =) (£)950.9(0)<br><br>If 0 missing from the final answer, lose at least QWC1<br><br>Look for<br>• spelling<br>• clarity of labels<br>• the use of notation (watch for the use ‘=’ “£” being appropriate)<br><br>QWC2: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>AND<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer<br><br>QWC1: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>OR<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer</td><td>M1<br>A1<br>M1<br>A1<br>M1<br>A1<br>B1<br><br><br><br><br><br><br><br><br><br>Q<br>W<br>C<br>2<br><br><br><br><br><br><br><br><br><br><br><br><br><br>9</td><td><br><br><br><br><br>FT if at least M2 awarded AND 3 values added.<br>If no marks awarded, award SC1 for sight of (£)25.7(0) OR (£)38.55<br><br>Alternative method<br>8×2 AND 6×3 M2. (award M1 for either)<br>16 AND 18 A1<br>40 + 18 + 16 M1 (FT provided 3 values added)<br>74 A1<br>74 × (£)12.85 M1 (FT their total hours)<br>(£)950.9(0) A1<br><br><br>QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.</td></tr>
</table>

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| | | |
|---|---|---|
| 5. 5<br>-3<br>6 - -6 = 12 | B1<br>B1<br>B2<br><br><br>4 | <br><br>Award B1 for 6 OR -6 in the correct place, provided 1st is positive AND 2nd negative, with their correct answer given e.g. 6 - - 1 = 7 or 5 - - 6 = 11 |
| 6. (a) $x = 7$<br>(b) $x = 9$<br>(c) $5x = 35$<br>$x = 7$ | B1<br>B1<br>B1<br>B1<br><br>4 | *Accept embedded answers throughout question*<br><br><br>FT "their 35" ÷ 5. If this leads to a whole number it must be correctly evaluated. Mark final answer. |
| 7. For a trial that gives an area of 30 $cm^2$<br><br>For a trial that gives an area of 30 $cm^2$ and the value of the perimeter stated.<br>(Length) 6(cm) and (width) 5(cm)<br>(Perimeter =) 22 (cm) | B1<br><br>B1<br><br>B1<br>B1<br><br><br><br><br>4 | Accept non-whole number trial eg 4 × 7.5<br>*Maybe seen on a diagram*<br>Accept non-whole numbers with the correct perimeter<br><br>Accept (width) 6(cm) and (length) 5(cm)<br><br>1 by 30 62cm<br>2 by 15 34cm<br>3 by 10 26cm<br>5 by 6 22cm |
| 8. (a) For all 4 correct as fractions that allows comparison<br><br>7/12, 2/3, ¾ , 5/6 or equivalent fractions (e.g. 7/12, 8/12, 9/12, 10/12)<br><br>(b) 390 ÷ 3<br><br>.... × 5<br>650 | M2<br><br><br>A1<br><br><br>M1<br><br>m1<br>A1<br>6 | Award M1 for any two correct in a fraction that allows comparison<br><br><br>*If no marks awarded, award SC1 for correct order without using equivalent fractions*<br><br><br><br>Accept in either order × 5 ÷ 3. Award M1 for sight of 130 or 1950<br>CAO |
| 9. (a)<br>7 AND 5 multiplied by 0.8<br>5.6 AND 4 (m)<br>5.6 × 4<br>= 22.4<br>$m^2$<br>(b) 35 × 45 × 20<br>31500<br>31500 ÷ (100 × 15)<br>21 (cm) | <br>M1<br>A1<br>M1<br>A1<br>U1<br>M1<br>A1<br>M1<br>A1<br>9 | *Accept equivalent in cm*<br><br>Seen or implied<br>FT their 5.6 AND 4 but not 7 × 5<br><br>Independent mark<br><br>Seen or implied in further calculations<br>FT their 31500 |
| 10. (a) (28416/38400) × 100<br>74(%)<br>(b) 766 + 766×12/100 OR 766 × 1.12<br>(£)857.92<br>(c) 2/5 or equivalent fraction | M1<br>A1<br>M1<br>A1<br>B1<br>5 | Or equivalent full method<br><br>Or equivalent full method<br><br>CAO |
| 11. (a) Enlargement scale factor 2<br>Correct position<br><br>(b) Correct reflection in $y = x$<br><br>(c) Correct translation<br><br>(d) Correct rotation | B2<br>B1<br><br>B2<br><br>B1<br><br>B2<br><br>8 | B1 for any 3 lines correct, or consistent incorrect scale<br>At least 2 points are needed to indicate the correct position<br><br>B1 for a reflection in $y = -x$,<br>OR for sight of the line $y = x$<br><br><br>B1 near miss, OR 90°clockwise rotation about (2, 1),<br>OR 90° anticlockwise rotation about (1, 2) |

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| | | |
|---|---|---|
| 12. (a) $9x - 4 = 7x + 14$<br>$9x - 7x = 14 + 4$ or $2x = 18$<br>$x = 9$<br>(b) $10x > 40$<br>$x > 4$ | B1<br>B1<br>B1<br>M1<br>A1<br><br><br>5 | *FT until 2nd error*<br><br><br>No marks for use of "=", unless finally replaced to give x>4 then award M1 A1.<br>SC1 for x>5 from 10x>50<br>OR sight of 9×6=54 AND 9×7=63 |
| 13. (a) $4.5 \times 12.4$<br>$55.8\ (cm^2)$<br>(b) $x + x+2 + 2x + 3x + 5 + 4x\ (= \ldots)$<br>$11x + 7 = 95$ or $11x = 88$<br>$x = 8$ | M1<br>A1<br>M1<br>m1<br>A1<br>5 | <br>Accept $56(cm^2)$ from correct working<br>For the expression with intention to sum the terms given<br><br>CAO.<br>Unsupported x=8 is awarded no marks |

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# UNIT 2 (HIGHER TIER)

<table>
<tr><th>Methods 2 Higher Summer 2013</th><th></th><th>Final</th></tr>
<tr><td>1(a) (28416/38400) × 100<br>74(%)<br>(b) 766 + 766×12/100 OR 766 × 1.12<br>(£)857.92<br>(c) 2/5 or equivalent fraction</td><td>M1<br>A1<br>M1<br>A1<br>B1<br>5</td><td>Or equivalent full method<br><br>Or equivalent full method<br><br>CAO</td></tr>
<tr><td>2(a) Enlargement scale factor 2<br>Correct position<br><br>(b) Correct reflection in $y = x$<br><br>(c) Correct translation<br><br>(d) Correct rotation</td><td>B2<br>B1<br><br>B2<br><br>B1<br><br>B2<br>8</td><td>B1 for any 3 lines correct, or consistent incorrect scale<br>At least 2 points are needed to indicate the correct position<br><br>B1 for a reflection in $y = -x$,<br>OR for sight of the line $y = x$<br><br><br>B1 near miss, OR 90°clockwise rotation about (2, 1),<br>OR 90° anticlockwise rotation about (1, 2)</td></tr>
<tr><td>3. Method for finding yellow (2.5 × 2÷3 = 1.666…), or<br>Method for finding red (2.5×5÷3 = 4.166…), or<br>Method for finding white (2.5×90÷3 = 75)<br><br>Red 4.166… (litres)<br>AND Yellow 1.666.. (litres)<br>AND White 75 (litres)<br><br><table><tr><th>Colour</th><th>Number and sizes of tins to buy</th></tr><tr><td>White</td><td>7 × 10 litre, 2 × 2.5 litre</td></tr><tr><td>Red</td><td>1 × 2.5 litre, 2 × 1 litre</td></tr><tr><td>Yellow</td><td>2 × 1 litre tins</td></tr></table><br>Look for<br>• spelling<br>• connection of colour name with calculation<br>• clarity of text explanations and statements<br>• the use of notation<br>• units (litres or l)<br><br>QWC2: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>AND<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer<br><br>QWC1: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>OR<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer</td><td>M1<br><br><br><br>A2<br><br><br><br><br><br><br><br><br><br>B1<br><br>B1<br><br>B1<br><br><br><br><br><br>QWC 2<br><br><br><br><br><br><br><br>8</td><td>Or equivalent correct method for one colour<br><br><br><br>Answers must be from appropriate calculations, correct working with appropriate rounding or truncation<br>A2 for all three correct, accept suitable rounding or truncation, e.g. do not accept red 4 litres, yellow 1 litre<br>For example:<br>Red (accept values 4.1,4.15, 4.16, 4.17,4.2, 4.5litres)<br>Yellow (accept 1.6, 1.7, 2 litres)<br>White (accept 74.7, 74.9, 75 litres)<br><br>A1 for any two correct<br><br>FT for their amount of paint provided M1 awarded and more than 1 tin is needed for the colour<br>Accept equivalent tin sizes available, e.g. 5 × 1 litre tins<br><br>For Red do not accept 2 × 2.5 litre nor 5 × 1 litre<br><br>For Yellow do not accept 1 × 2.5 litre tins<br><br><br><br>QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.</td></tr>
</table>

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| | | |
|---|---|---|
| 4(a) $x = 60 \times 5 / 8$<br>$x = 37.5$<br>(b) $x = 1/4$ or 0.25 or equivalent<br>(c) $9x - 4 = 7x + 14$<br>$9x - 7x = 14 + 4$ or $2x = 18$<br>$x = 9$<br>(d) $10x > 40$<br>$x > 4$<br><br>(e) $x > 60/9$ or $x > 6.6(666)$<br>7 | B1<br>B1<br>B1<br>B1<br>B1<br>B1<br>M1<br>A1<br><br>M1<br>A1<br><br>10 | *FT until 2nd error*<br>Accept 300/8 or equivalent. Mark final answer<br>Accept 3/12. Mark final answer<br>*FT until 2nd error*<br><br><br>No marks for use of "=", unless finally replaced to give x>4 then award M1 A1.<br>SC1 for x>5 from 10x>50<br>OR sight of 9×6=54 AND 9×7=63<br>Do not accept final answer of (x)>7.<br>Do not penalise use of '=' if 7 is given as a final response, award M1, A1 |
| 5(a) $4.5 \times 12.4$<br>55.8 ($cm^2$)<br>(b) $34.6 = \Pi \times r^2$<br>$r^2 = 34.6/\Pi$<br>r = 3.3(186… cm)<br>(c) x + x+2 + 2x + 3x + 5 + 4x (= …)<br>11x + 7 = 95 or 11x = 88<br>x = 8 | M1<br>A1<br>M1<br>A1<br>A1<br>M1<br>m1<br>A1<br>8 | <br>Accept 56($cm^2$) from correct working<br><br><br>Accept 3(cm) or 3.3(cm) from correct rearrangement<br>For the expression with intention to sum the terms given<br><br>CAO.<br>Unsupported x=8 is awarded no marks |
| 6(a) 4.4<br>(b) 637 (× …)<br>( … × ) 3192<br>= 2033304 | B2<br>B1<br>B1<br>B1<br>5 | B1 for 4.38(13…) or 4.3<br><br><br>FT correct evaluation of product from 1 correct value<br>*If no marks then SC1 for interpretation of 'product' and 'of' e.g. by sight of 2 1/3 ×273 ×4 1/5 ×760* |
| 7. Strategy: use of Pythagoras' Theorem<br>**and** C=Πd or C=2Πr<br>$h^2 = 4.2^2 + 4.2^2$<br>$h = \sqrt{35.28}$<br>diameter = 5.9(39…cm) or radius = 2.9698…(cm)<br><br><br>C = Π × 5.939… OR C = 2 ×Π × 2.9698.. .<br><br>18.5 (cm) to 18.7(cm) | S1<br><br>M1<br>A1<br>A1<br><br><br><br>m1<br><br>A1<br>6 | OR alternative full correct strategy<br><br>OR alternative <u>complete</u> method<br><br>Accept diameter = 6(cm) or radius = 3(cm), do not accept radius = 2.9. Clarification of diameter or radius may be implied in further work, penalise here with A0, then FT<br>FT their radius or diameter as appropriate provided M1 awarded, including use of r= 5.9(39…)<br>(r = 5.9(39…) leads to 37(. 4..cm) |
| 8(a) Method to clear fractions, all 3 terms<br>$3(3x - 1) - 4(x + 6) = 3 \times 6$<br><br><br>$9x - 3 - 4x - 24 = 18$ OR $5x - 27 = 18$ OR $5x = 45$<br>$x = 9$<br><br><br>(b) Sin x = 28.7/34.2<br>57(.0537...°) or 57(.1°)<br>(c) $1.5 \times 10^{11}$ | M2<br><br><br><br>A1<br>A1<br><br><br>M1<br>A2<br>B2<br>9 | Intention, i.e. brackets may be missing<br>M1 for clearing fractions 2 terms<br>Fractions must be cleared before M marks can be awarded, not for quotients<br>FT from M1 or M2<br>FT provided M1 awarded<br>*If no marks SC1 sight of (5x - 27)/12*<br><br><br>A1 for x = $\sin^{-1}$ 0.839(181…)<br>B1 for 1.54(347…) × $10^{11}$ |
| 9. (x = ) 8.4 × 6/5<br>= 10(.08 cm) or 10.1(cm)<br>(y = ) 4.32 / 6/5 or (y = ) 4.32 × 5/6<br>= 3.6 (cm) | M1<br>A1<br>M1<br>A1<br>4 | Or equivalent calculation that could lead to correct answer<br><br>Or equivalent calculation that could lead to correct answer<br><br> |

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|---|---|---|
| 10.(a) Any two points correct, with no incorrect points<br><br><br><br><br>Correct straight line drawn from ( but not beyond) (30,40) inclusive to (0,10) exclusive<br>(b) Explanation of implied NO, e.g. 'not possible to have a rectangle with zero lengths' | M2<br><br><br><br><br>A1<br><br>E1<br>4 | Accept (0, 10) as one of the points with 1 other point, provided no other incorrect points plotted<br>M1 any one point correct provided no incorrect points plotted, do not accept (0, 10), OR<br>M1 for any 2 correct points not including (0,10)<br><br>Accept indication for lots and lots of points between.<br>Accept to (0, 10) but not beyond |
| 11(a) Two **different** corresponding sides and an included angle indicated.<br>(b) Right angle, hypotenuse and a corresponding **different** side indicated<br>OR Right angle, hypotenuse and a corresponding **different** angle indicated | B2<br><br>B2<br><br><br><br><br>4 | B1 Two corresponding sides not marked as different and the included angle indicated<br>B1 Right angle, hypotenuse and a corresponding different length indicated but not marked as different<br>B1 Right angle, hypotenuse and a corresponding angle indicated but angles not marked as different, or<br>Right angle, hypotenuse & the both of 2 corresponding sides marked differently as appropriate<br>*Accept right angles indicated either as 90° or ☐ at vertex* |
| 12.<br><br>Amount: £**820**<br>After a decrease of: 40% £492; 2% £**803.6(0)** | B4<br><br><br>4 | B3 for 820, or<br>B2 for 492 × 100/ 60, or<br>B1 for '60% is 492', or<br>B1 for 0.98× 'their 820' correctly evaluated to nearest penny or unrounded |
| 13.<br>(a) $-7\boldsymbol{x} + 10\boldsymbol{y}$<br>(b)(i) $-6\boldsymbol{x} - 3\boldsymbol{y}$ or factorised equivalent<br>(ii) $-6\boldsymbol{x} + 7\boldsymbol{y}$ | <br>B1<br>B1<br>B1<br><br>3 | Mark final answer in each part<br><br><br>FT (b)(i) + $10\boldsymbol{y}$ simplified correctly<br>If (i) and (ii) both correct but left in unsimplified form allow SC1 |
| 14. Strategy: Use of ½ abSinC and cosine rule<br>$42.8 = ½ \times BC \times 17.8 \times \sin 34$<br>BC = 8.59987…<br>$AB^2 = BC^2 + 17.8^2 - 2 \times BC \times 17.8 \times \cos 34$<br>$AB^2 = 136.98…$<br>AB = 11.7(… cm) | S1<br>M1<br>A1<br>M1<br>A1<br>A1<br><br><br><br><br>6 | Or equivalent full strategy<br><br><br>FT their BC, but not as 17.8<br><br>Accept 12(cm) from correct working. CAO<br><br>*Alternative:*<br>*S1 complete strategy, e.g. with perpendicular with appropriate trigonometry for both triangles*<br>*M1, A1 for the RHS triangle*<br>*M1, A1, A1 for the LHS triangle* |
| 15.Volume sphere = $4 \times \Pi \times 6.7^3/3$ $(=1259(.833\ cm^3))$<br>Volume cone = $\Pi \times r^2 \times 10.4 / 3$<br>$r^2 = \frac{\text{Volume sphere} \times 3}{\Pi \times 10.4}$<br><br>$r^2 = 115.678...$<br>r = 10.8(cm) | B1<br>B1<br>M1<br><br><br><br>A1<br>A1<br><br><br><br><br><br>5 | <br><br>FT their volume sphere provided dimensions $cm^3$ for M1 only<br>Or equivalent rearrangement to isolate $r^2$<br><br>CAO. Must be to 1d.p.<br><br>Alternatively:<br>$4/3 \times \pi \times R^3 = 1/3 \times \pi \times r^2 \times h$ B1<br>$4 \times R^3 = r^2 \times h$ B1<br>$4 \times 6.7^3 = r^2 \times 10.4$ M1<br>$r^2 = 115.678..$ A1<br>$r = 10.8(cm)$ A1 CAO |

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| | | |
|---|---|---|
| 16. $x(x + 2) = y$ (ISW)<br>$12(5 + x) = 4y$ (ISW)<br><br>$x(x+ 2) = 15 + 3x$ OR $12(5 + x) = 4x(x + 2)$<br>OR equivalent<br><br>$x^2 - x - 15 = 0$ OR $4x^2 – 4x – 60 = 0$<br><br>$x = \{ 1 \pm \sqrt{(-1^2 - 4\times1\times-15)}\}/ 2$<br>OR $x = \{ 4 \pm \sqrt{(-4^2 - 4\times4\times-60)}\}/ 2\times4$<br><br>$x = (1 \pm \sqrt{61})/2$ OR $x = (4 \pm \sqrt{976})/8$<br>$(x =) 4.4$ (cm)<br>$(x + 2 =) 6.4$ (cm) | B1<br>B1<br><br>M1<br><br>A1<br><br>M1<br><br>A1<br>A1<br>A1<br>8 | The first two B1 marks maybe implied by the correct quadratic, hence if M1 awarded also award BOTH these B1 marks<br>Equating or substituting, allow 1 error, e.g. missing brackets, or from incorrect expansion. FT provided at least B1 and equivalent level of difficulty<br>Must be equate to zero<br><br>Allow 1 slip in substitution.<br>FT 'their 3 term quadratic' of equivalent level of difficulty for M1 and final A1 only<br><br>(-3.4 is not required)<br>FT provided M1 awarded |
| 17. Idea of right angled triangle shown or used with height b, base a<br>$\sin\theta = b(/1)$<br>$\cos\theta = a/(1)$ | M1<br><br>A1<br>A1<br><br>3 | <br><br>Accept $b/\sqrt{(a^2 + b^2)}$<br>Accept $a/\sqrt{(a^2 + b^2)}$<br>*If A0 due to notation $–a^2$ as $(-a)^2$ but otherwise correct, then allow SC1 as well as M1* |



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| Surname | Centre Number | Candidate Number |
|---|---|---|
| Other Names | | 0 |

# GCSE LINKED PAIR PILOT

4364/01

# METHODS IN MATHEMATICS

## UNIT 2: Methods (Calculator) FOUNDATION TIER

A.M. THURSDAY, 17 January 2013

$1\frac{1}{2}$ hours

### ADDITIONAL MATERIALS

A calculator will be required for this paper.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take $\pi$ as 3·14 or use the $\pi$ button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **10**.

| For Examiner's use only | | |
|---|---|---|
| **Question** | **Maximum Mark** | **Mark Awarded** |
| **1** | **2** | |
| **2** | **9** | |
| **3** | **3** | |
| **4** | **8** | |
| **5** | **8** | |
| **6** | **5** | |
| **7** | **4** | |
| **8** | **5** | |
| **9** | **3** | |
| **10** | **6** | |
| **11** | **4** | |
| **12** | **6** | |
| **13** | **8** | |
| **14** | **2** | |
| **15** | **4** | |
| **16** | **3** | |
| **TOTAL MARK** | | |

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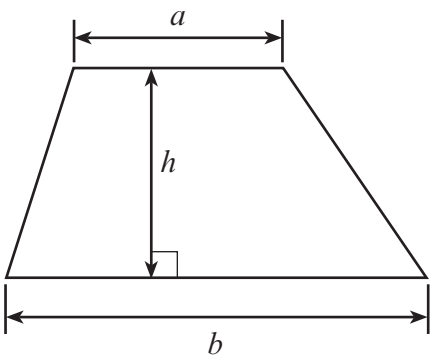
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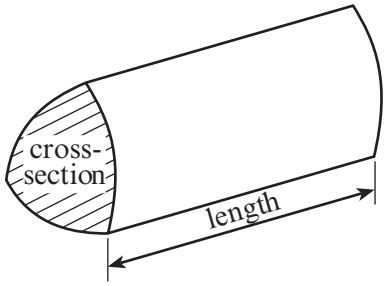
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## Formula List

**Area of trapezium** = $\frac{1}{2}(a + b)h$




**Volume of prism** = area of cross-section × length

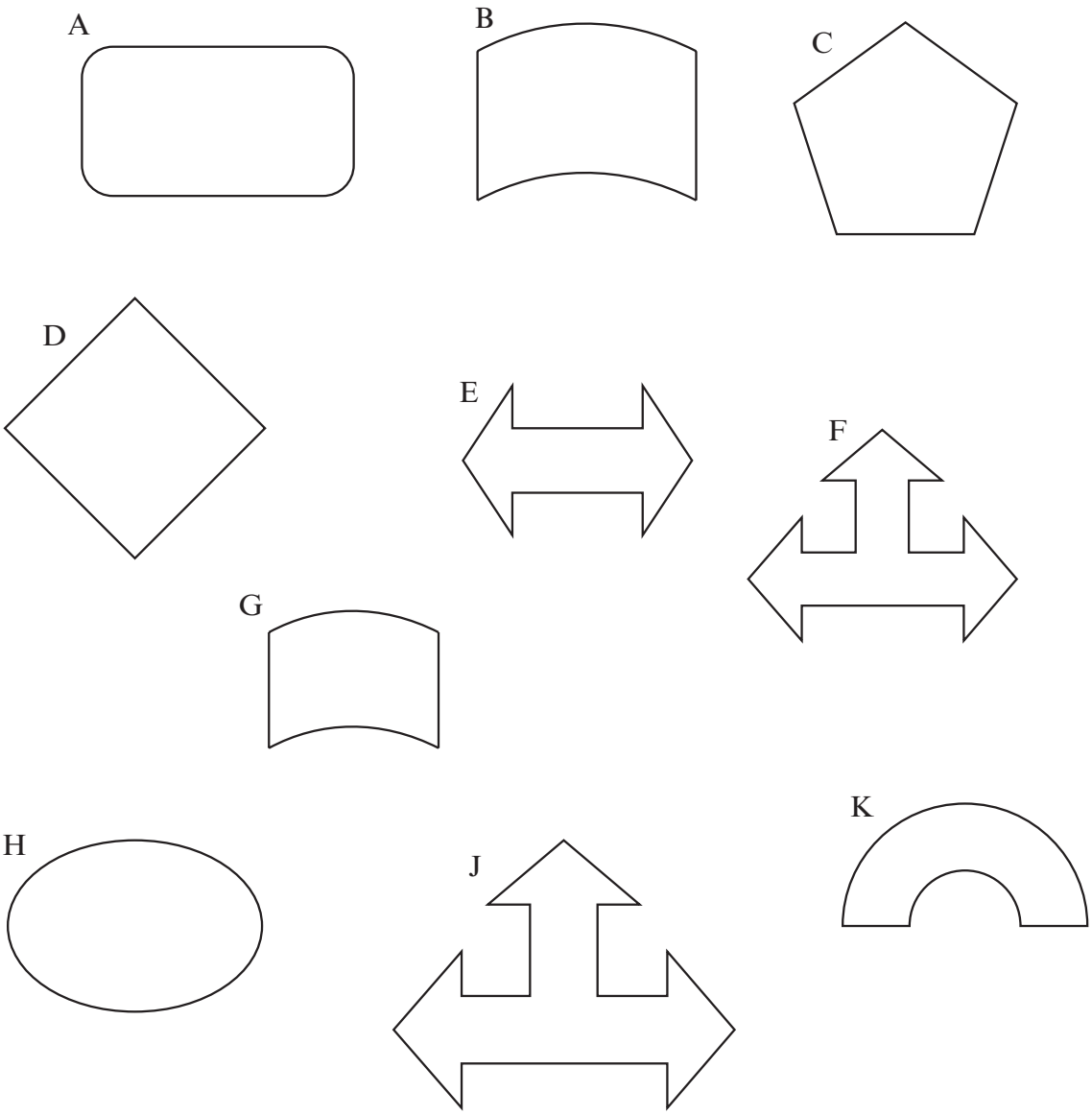



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**1.** Using the following diagrams, write down two pairs of similar shapes.




One pair of similar shapes is ..... and .....

Another pair of similar shapes is ..... and .....

[2]

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**2.** *(a)* Find 27% of 830.

.....

.....

.....

[2]

*(b)* Daniel was given £1500.
He spent $\frac{1}{3}$ of the money on his car and $\frac{1}{5}$ of the money going out with friends.
He saved the rest of the money.
How much money did he save?

.....

.....

.....

.....

.....

.....

[4]

*(c)* Write 0·3 as a percentage. .....

Write $\frac{17}{50}$ as a percentage. .....

Write 0·3, $\frac{17}{50}$ and 28% in ascending order.

.....

[3]

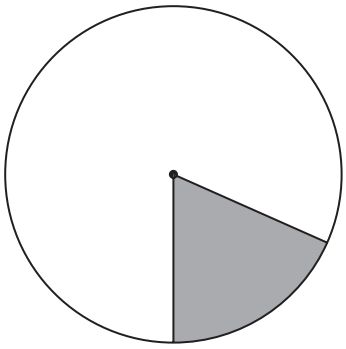
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**3.** *(a)* Using the words given in the following table, choose the name of the shaded part of the circle.

| Diameter | Segment | Sector | Arc |
|---|---|---|---|

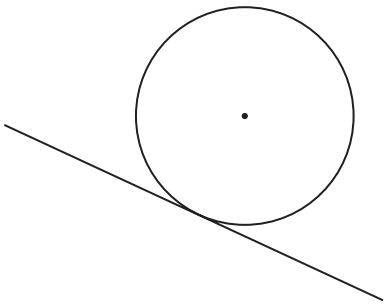


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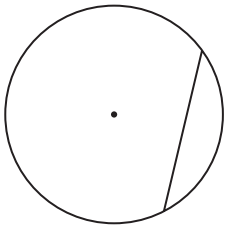
[1]

*(b)* Using the words given in the following table, choose the name of the straight line in each diagram shown below.

| Chord | Tangent | Radius | Circumference |
|---|---|---|---|



.....



.....

[2]

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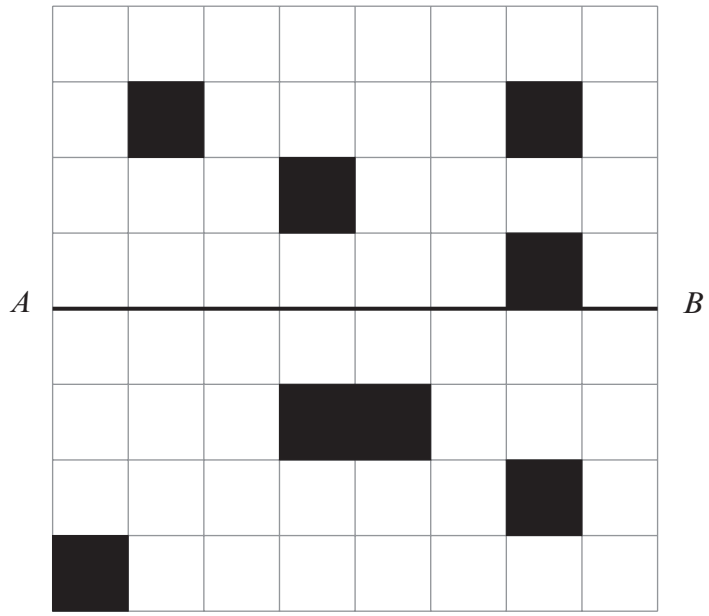
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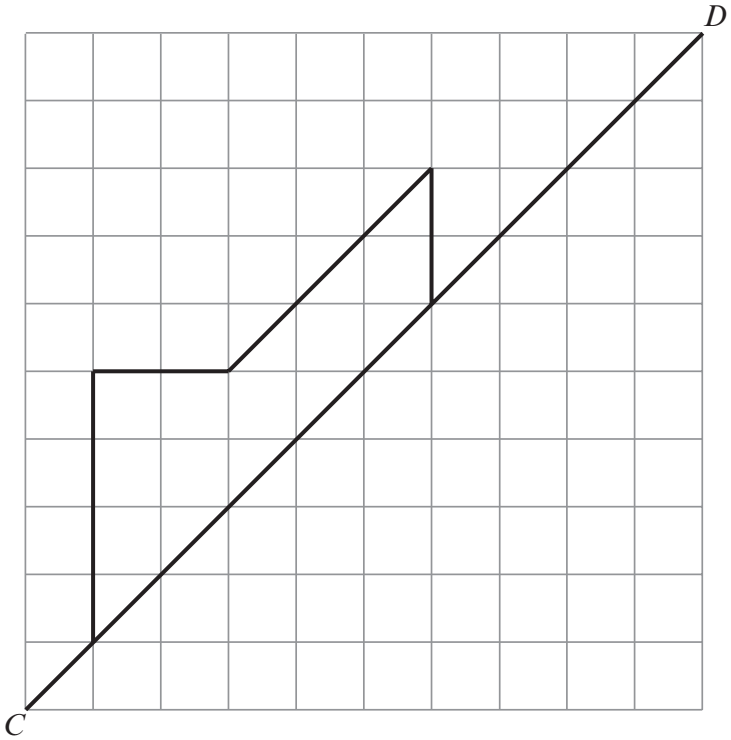
**4.** *(a)* Shade **four** squares to complete the diagram below so that it is symmetrical about the line $AB$.

[2]




*(b)* Complete the following diagram so that $CD$ is a line of symmetry.

[2]




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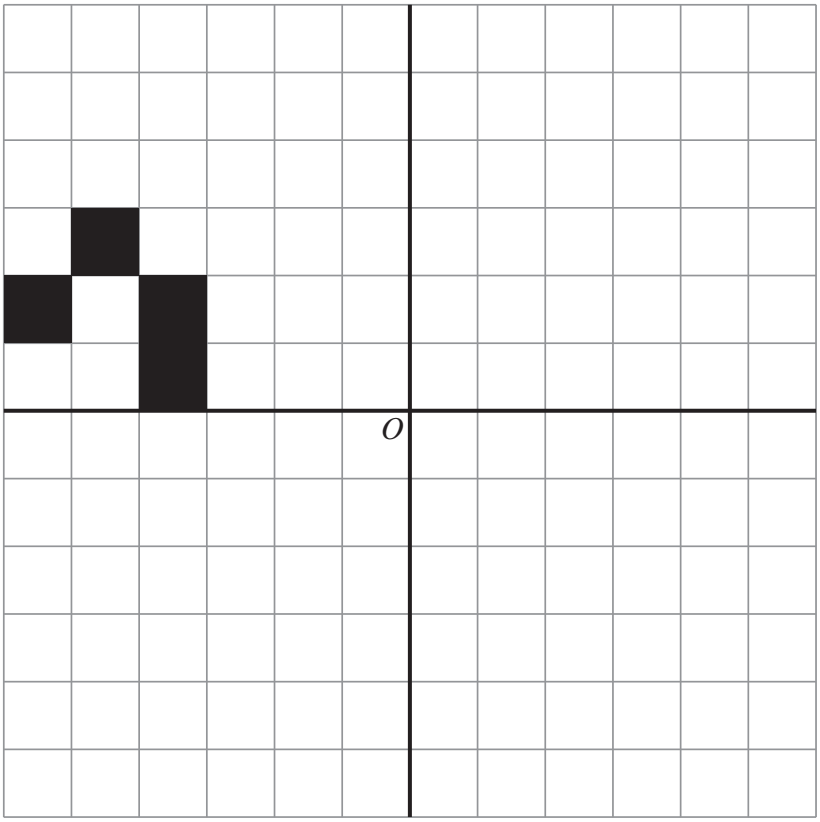


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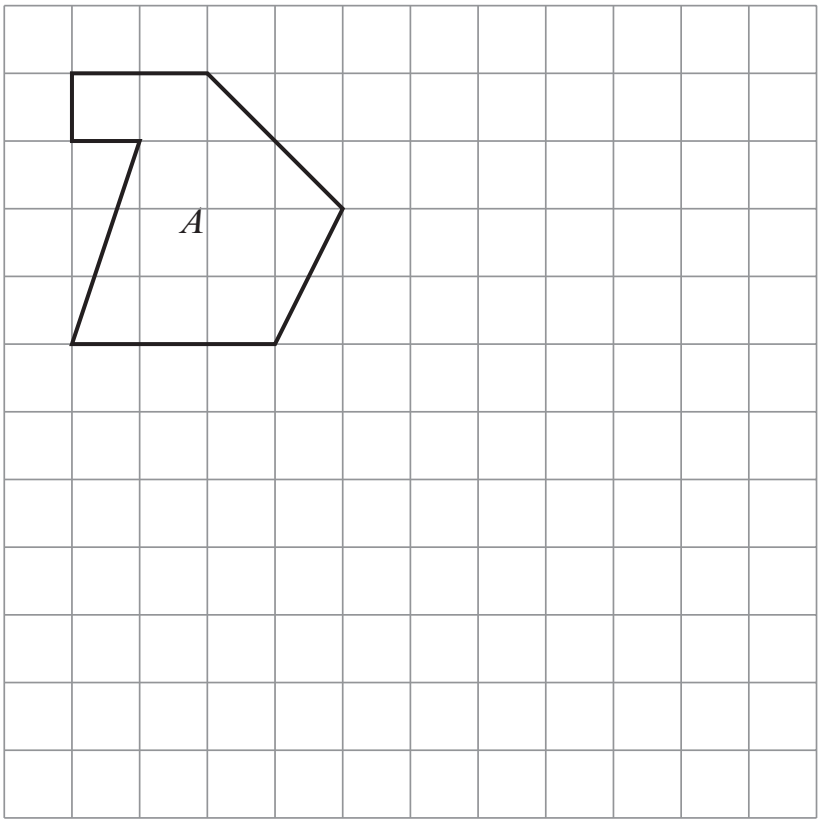
*(c)* Draw patterns, like the one given, in each of the other 3 sections so that the completed pattern has rotational symmetry of order 4 about *O*.

[3]




*(d)* On the grid below, draw a shape that is congruent to the given shape *A*.

[1]




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**5.** *(a)* Find $\frac{3}{4}$ of 156.

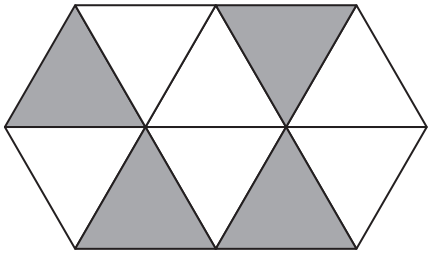
.....

.....

.....

[2]

*(b)*



(i) What percentage of the shape above is shaded?

.....

[1]

(ii) What percentage of the shape above is NOT shaded?

.....

.....

[1]

*(c)*

| | | | |
|---|---|---|---|
| 6 : 3 | $\frac{2}{6}$ | 20 : 5 | $\frac{3}{4}$ |
| $\frac{5}{20}$ | 4 : 16 | $\frac{4}{12}$ | 7 : 28 |

From the table above, select

(i) two **fractions** that are equivalent to $\frac{1}{3}$.

.....

.....

[2]

(ii) two **ratios** that are equivalent to 1 : 4.

.....

.....

[2]

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**6.** *(a)* Flowers costing £4.76 and chocolates costing £6.59 are paid for using a £20 note.
How much change will be given?

.....

.....

.....

.....

[3]

*(b)* How many DVDs costing £7.89 can be bought with £50?

.....

.....

.....

.....

[2]

**7.** In the following table, the letters $a$, $b$, $c$ and $d$ represent different numbers.
The total for each row is given at the side of the table.
Find the values of $a$, $b$, $c$ and $d$.

| | | | | |
|---|---|---|---|---|
| $a$ | $a$ | $a$ | $a$ | 16 |
| $a$ | $b$ | $b$ | $a$ | 18 |
| $a$ | $c$ | $c$ | $c$ | 13 |
| $a$ | $b$ | $c$ | $d$ | 14 |

.....

.....

.....

.....

$a$ = ..... $b$ = ..... $c$ = ..... $d$ = .....

[4]

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**Turn over.**

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**8.** Solve each of the following equations.

*(a)* $8 + x = 21$

.....

.....

[1]

*(b)* $x - 3 = -7$

.....

.....

[1]

*(c)* $8x = 32$

.....

.....

[1]

*(d)* $2x - 5 = 9$

.....

.....

.....

[2]

**9.** Find the value of each of the following calculations.

*(a)* $\dfrac{232{\cdot}6 - 75{\cdot}8}{0{\cdot}5}$

.....

.....

[1]

*(b)* $8{\cdot}6^2 - \sqrt{40{\cdot}2 + 51{\cdot}96}$

.....

.....

.....

.....

[2]

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**10.** *You will be assessed on the quality of written communication in this question.*

"Cuppa - Jo" smooth roast coffee is sold in a variety of sizes.

| 200 grams | 100 grams | 400 grams |
|---|---|---|
|  |  |  |
| £5.60 | £3 | £11.80 |

Decide which size of "Cuppa - Jo" smooth roast coffee is the best buy and why.
You must show the calculations that support your decision.

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.....

[6]

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**11.** *(a)*




From the list above,

(i) select the multiplier that is used to find 25% of a value.

.....

.....

[1]

(ii) select the multiplier that will **increase** a value by 40%.

.....

.....

[1]

*(b)* (i) Susan says that $30 - 6 \div 2$ is 12.
Susan is incorrect.
The correct answer is 27.
Explain the mistake that Susan has made.

.....

.....

.....

[1]

(ii) Place + , – , × or ÷ into the following to make it true.

$$12 \quad \ldots\ldots \quad 8 \quad \ldots\ldots \quad 3 = 36$$

[1]

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**12.** *(a)*

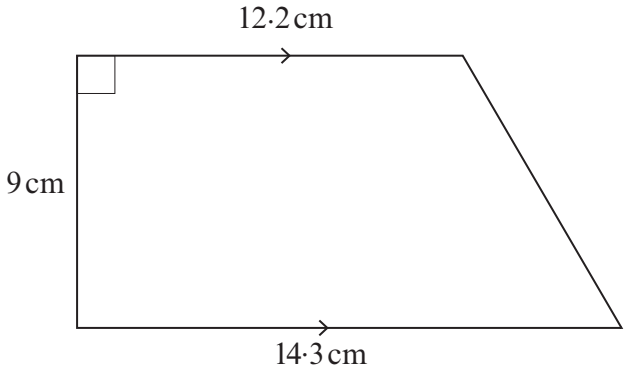



*Diagram not drawn to scale*

Calculate the area of the trapezium shown above giving the units for your answer.

.....

.....

.....

.....

[3]

*(b)*

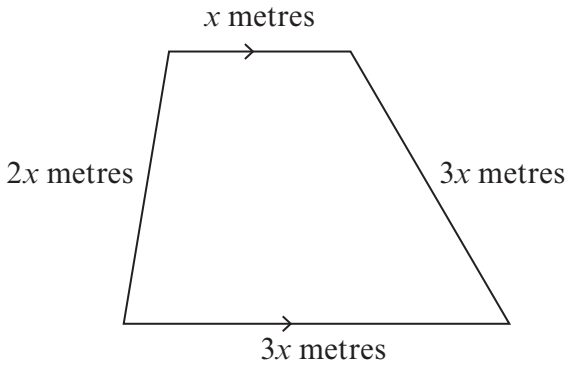



*Diagram not drawn to scale*

The perimeter of this trapezium is 108 metres.
Find the length of each side of this trapezium.

.....

.....

.....

.....

.....

.....

[3]

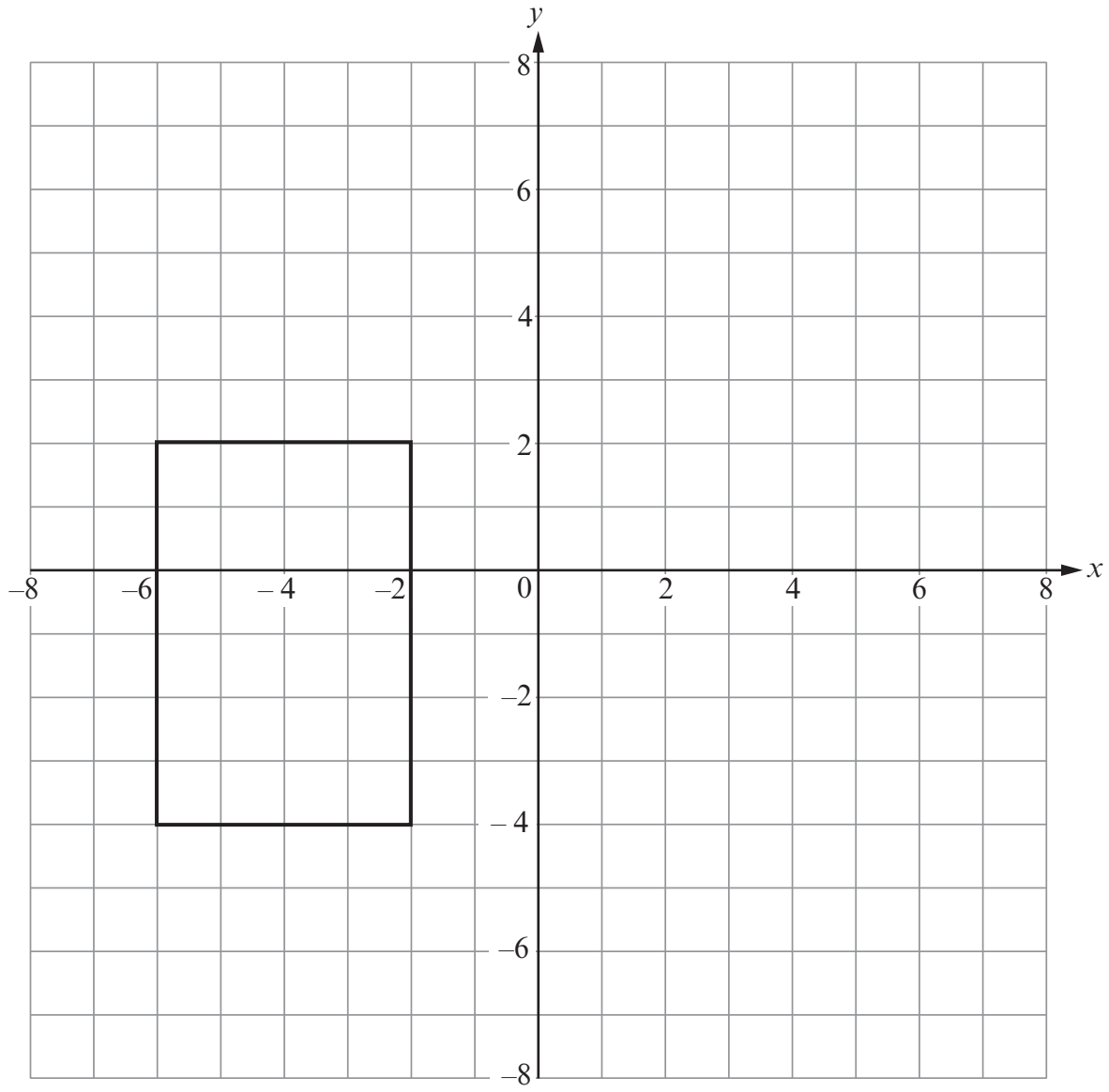
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**13.** *(a)* Translate the rectangle shown below by $\begin{pmatrix} 2 \\ 4 \end{pmatrix}$.




[1]

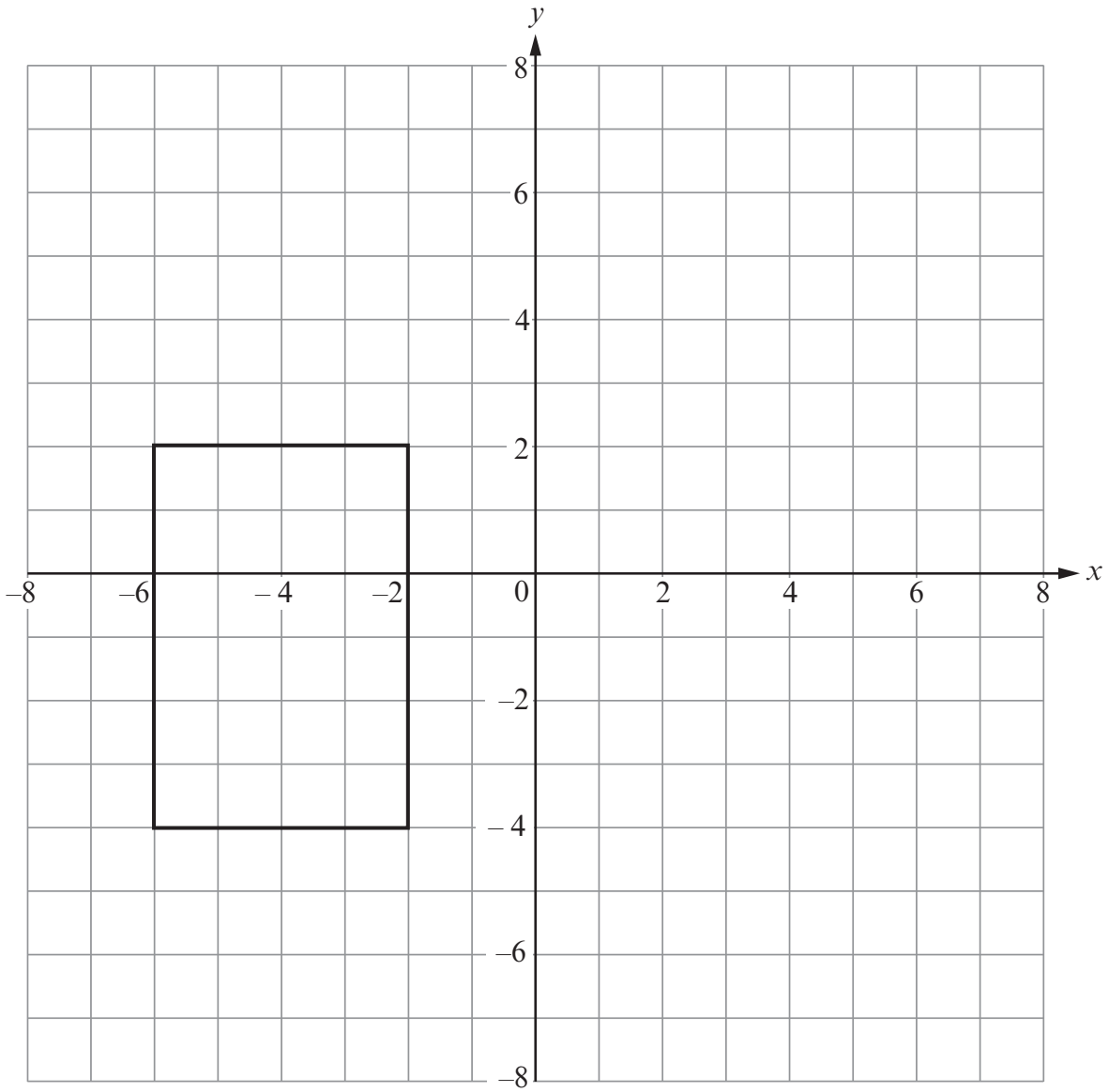
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*(b)* Rotate the rectangle shown on the grid below through 90° clockwise about the origin.




[2]

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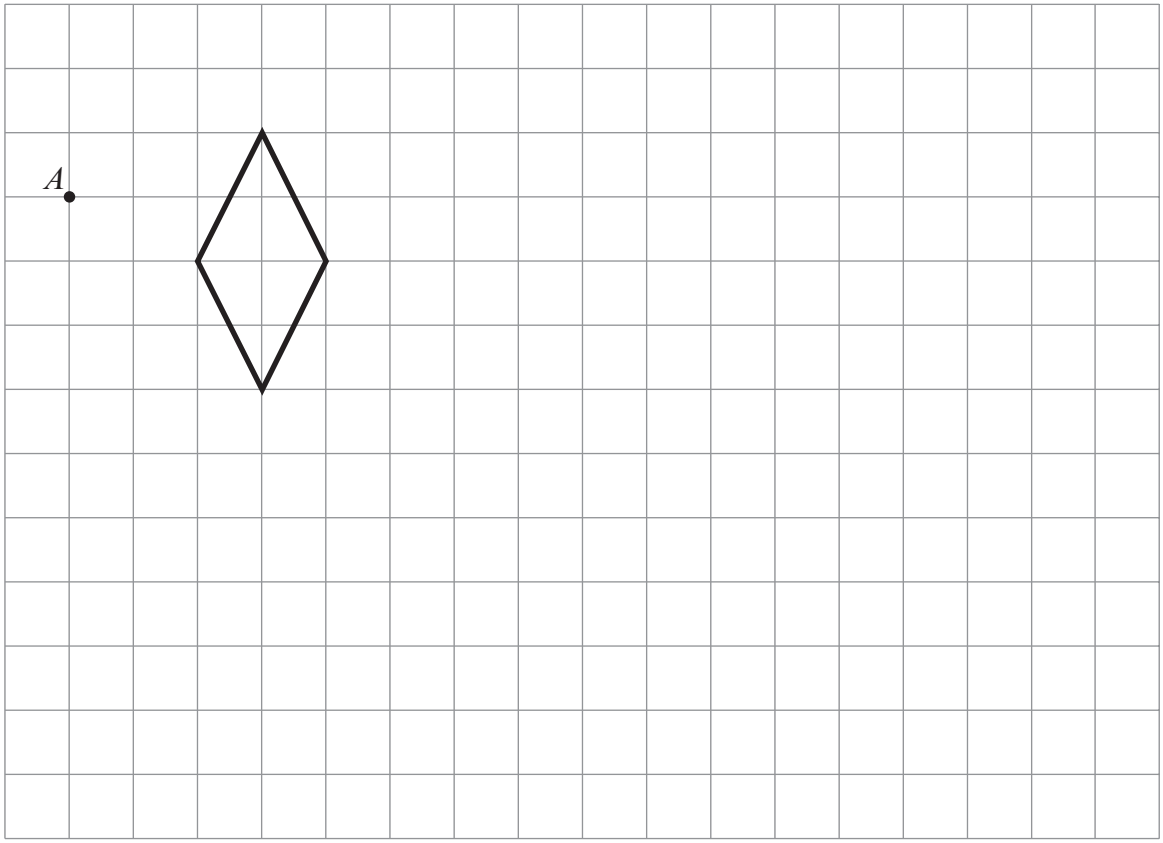


**Turn over.**

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*(c)* Enlarge the shape shown on the grid below by a scale factor of 2 using $A$ as the centre of enlargement.




[3]

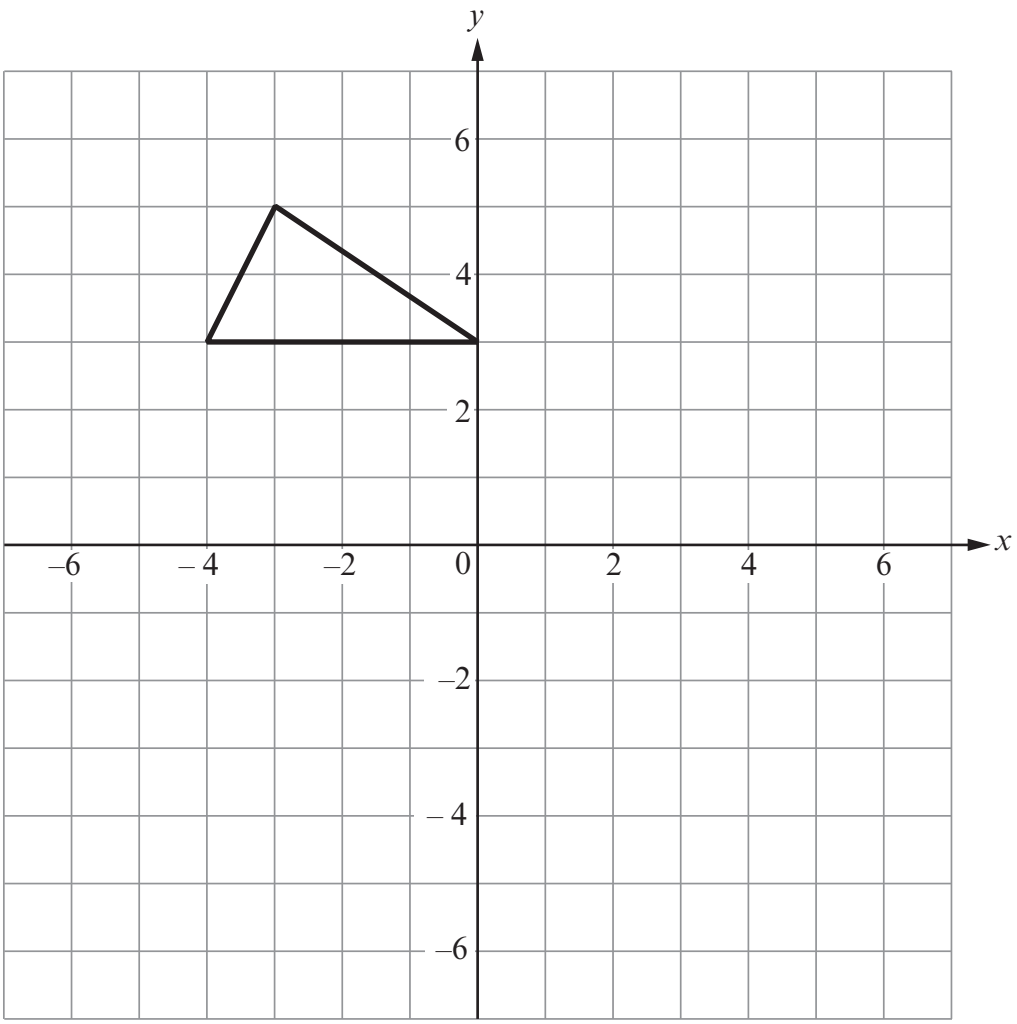
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*(d)* Reflect the triangle in the line $x = 1$.




[2]

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**Turn over.**

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**14.** Solve the inequality $3x - 4 < 26$.

.....

.....

.....

[2]

**15.**

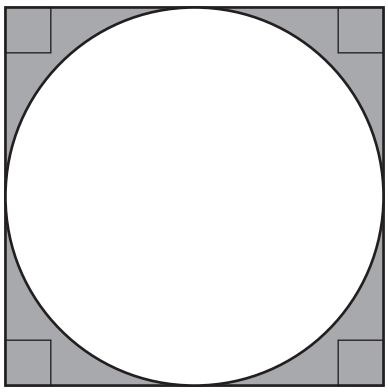


*Diagram not drawn to scale*

In the diagram above, the circle has a diameter of 12 cm.
Calculate the area of the shaded part.

.....

.....

.....

.....

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.....

[4]

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**16.**

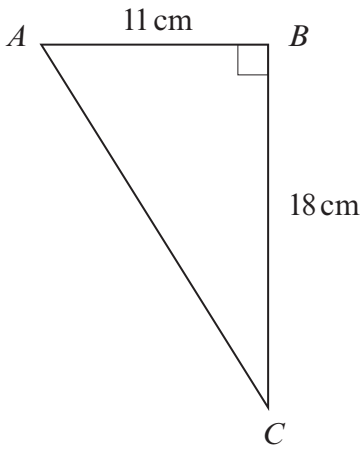



*Diagram not drawn to scale*

Calculate the length of the side $AC$.

.....

.....

.....

.....

.....

[3]

**END OF PAPER**

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# GCSE MARKING SCHEME

## METHODS IN MATHEMATICS (LINKED PAIR PILOT)

## JANUARY 2013

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## INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2013 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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## UNIT 2 - FOUNDATION TIER

| Methods Unit 2 Foundation Tier January 2013 | | Final |
|---|---|---|
| 1. F and J OR J and F<br>B and G OR G and B | B1<br>B1<br>2 | |
| 2. (a) 27/100 × 830<br>224.1 | M1<br>A1 | Or equivalent. Sight of 224 is evidence of M1<br>CAO Ignore units. Ignore subsequent rounding if 224.1 is given |
| (b) (1/3 of 1500 =) (£)500<br>(1/5 of 1500 =) (£)300<br>Saved 1500 – 500 - 300<br>Saved (£)700<br>(c) 30(%)<br>34(%)<br>28%, 0.3, 17/50 or equivalent | B1<br>B1<br>M1<br>A1<br>B1<br>B1<br>B1<br>9 | *1/3 + 1/5 M1*<br>*8/15 spent A1*<br>FT 1500 – 'their 500' - 'their 300' *7/15 saved B1*<br>*(£)700 B1*<br><br><br>FT 'their 30%' and 'their 34%' |
| 3. (a) Sector<br>(b) Tangent<br>Chord | B1<br>B1<br>B1<br>3 | |
| 4. (a) 4 squares shaded correctly<br><br><br>(b) Correct diagram<br>(c) Correct diagram drawn<br><br>(d) correct shape drawn | B2<br><br><br>B2<br>B3<br><br>B1<br>8 | Award B1 for 3 correct and 1 incorrect OR B1 for between 5 and 8 shaded to produce a symmetrical diagram<br>-1 for each incorrect vertex<br>Award B2 for 2 sections drawn correctly, B1 for 1 section correctly drawn<br>Accept in any orientation |
| 5. (a) 3/4 × 156<br>117<br>(b) (i) 40(%)<br>(ii) 60(%)<br>(c) (i) 2/6 and 4/12<br>(ii) 4 : 16 and 7 : 28 | M1<br>A1<br>B1<br>B1<br>B2<br>B2<br>8 | Or equivalent<br><br><br>FT 100 – 'their 40' correctly evaluated<br>Award B1 for each. If more than 2 answers offered -1 for each incorrect answer in (i) and (ii) |
| 6. (a) (4.76 + 6.59=) 11.35<br>20 – 11.35<br>(£)8.65<br>(b) 50 ÷ 7.89<br><br>6 | B1<br>M1<br>A1<br>M1<br><br>A1<br>5 | Maybe implied<br>FT 20 – 'their 11.35'<br><br>Alternative method, award M1 for workings that could lead to 6<br>Answer of 6.3(37135...) is M1 A0 |
| 7. a = 4<br>b = 5<br>c = 3<br>d = 2 | B1<br>B1<br>B1<br>B1<br>4 | CAO<br>FT 9 – 'their a'<br>FT [13 – 'their a'] ÷ 3<br>FT 14 – 'their a + b + c' |
| 8. (a) $x$ = 13<br>(b) $x$ = - 4<br>(c) $x$ = 4<br>(d) 2$x$ = 14<br>$x$ = 7 | B1<br>B1<br>B1<br>B1<br>B1<br><br>5 | *Accept embedded answers throughout question*<br><br><br><br>FT 'their 14 ÷ 2'. Correctly evaluated if this leads to a whole number. |
| 9. (a) 313.6<br>(b) 64.36 | B1<br>B2<br>3 | <br>B1 for sight of 9.6 or 73.96 |

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| Methods Unit 2 Foundation Tier January 2013 | | Final |
|---|---|---|
| 10. Strategy for comparing sizes of coffee | S1 | Eg. looking at 100 grams of coffee for each size or idea of doubling or halving. |
| For 200 gram jar, cost for 100 grams is (£)2.8(0)<br>For 400 gram jar, cost for 100 grams is (£)2.95 | B2 | Award B1 for each.<br><br>Candidates could compare another size rather than 100 grams.<br>*Eg.*<br>*For 200 gram jar, cost for 400 grams is (£)11.2(0) B1*<br>*For 100 gram jar, cost for 400 grams is (£)12 B1*<br><br>*Cost per gram. Award B2 for all 3 correct. Award B1 for any 1 correct.*<br>*For 200g jar, cost is 2.8pence*<br>*For 100g jar, cost is 3 pence*<br>*For 400g jar, cost is 2.9(5) pence*<br><br>*Grams per pound(£). Award B2 for all 3 correct. Award B1 for any 1 correct.*<br>*For 200g jar, weight is 35.71g*<br>*For 100g jar, weight is 33.3...g*<br>*For 400g jar, weight is 33.89...g.*<br>*Allow rounded or truncated answers* |
| The 200 gram jar AND suitable reason/explanation | E1 | E.g. The 200 gram jar is the best buy because it costs less (per 100 grams than the other sizes.) OR the 200g jar because you get more coffee (per £1)<br>OR correct workings but reason given as – The 400g better because of less waste/number of jars etc. |
| QWC:<br>Look for<br>• Correct units used<br>• Spelling in at least 1 statement/sentence<br>• Clarity of text explanations<br>• Clearly linking working with size of coffee jar<br>• the use of notation (watch for the use '=' "£" being appropriate)<br>• 0 missing from 2.80<br>Count incorrect use of '=' in situations such as 200g = £5.60 within the few mistakes in mathematical form<br><br>QWC2: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>AND<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer<br><br>QWC1: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>OR<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer | Q<br>W<br>C<br>2<br><br>6 | QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| 11. (a) (i) × 0.25 selected<br>(ii) × 1.4 selected<br>(b) (i) Correct explanation given of either the error in her working OR the correct workings OR both<br><br>(ii) 12 + 8 × 3 = 36 | B1<br>B1<br>E1<br><br>B1<br>4 | CAO<br>CAO<br>Eg Susan subtracted 6 from 30 to get 24 and then divided by 2 to get 12.<br>OR She should work out 6 ÷ 2 = 3 first and then subtract 3 from 30.<br>OR should have used BIDMAS<br>CAO |

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| Methods Unit 2 Foundation Tier January 2013 | | Final |
|---|---|---|
| 12.(a) ½ (12.2 + 14.3) ×9<br>119.25<br>$cm^2$<br>(b) x + 2x + 3x + 3x = 108<br>x = 108/9 (=12)<br>12(m), 24(m), 36(m) (and 36(m)) | M1<br>A1<br>U1<br>M1<br>A1<br>A1<br>6 | <br><br>Indept. mark<br>Idea not notation important, Or alternative first step<br><br><br> |
| 13.(a) Correct translation<br>(b) Correct rotation<br><br>(c) Enlargement scale factor 2<br><br>Correct position<br>(d) Correct reflection in x = 1 | B1<br>B2<br><br>B2<br><br>B1<br>B2<br><br><br>8 | <br><br>B1 for a near miss (intention), OR anticlockwise rotation through 90°, OR sight of all 4 × 90° rotations<br>B1 for any 2 lines correct, or for consistent incorrect scale factor used<br><br><br>B1 for reflection in y = 1 or either axis, OR for the sight of the line x=1 or x = 1 implied, OR reflection in any vertical line indicated |
| 14. 3x < 30<br>x< 10 | M1<br>A1<br>2 | No marks for '=' unless final replaced to give x<10 then award M1, A1. An answer of x<30/3 gets M1, AO |
| 15. (area of square =) 144<br>(area of circle =) $\pi \times 6^2$<br>113 to 113.1428.....<br>(area of shaded part =) 30.857..... to 31 $cm^2$ | B1<br>M1<br>A1<br>A1<br><br>4 | <br><br><br>FT 'their area of square' – 'their area of circle' provided M1 awarded |
| 16. ($AC^2$=) $11^2 + 18^2$<br><br>$AC^2$= 445 or AC = √445<br>21.(095...) or 21.1 (cm) | M1<br><br>A1<br>A1<br>3 | Showing steps of squaring and adding.<br>Do not penalise notation if steps are clearly intended<br><br><br> |

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# UNIT 2 - HIGHER TIER

| Methods 2 Higher January 2013 | | Final |
|---|---|---|
| 1.(a) $(281.6/880) \times 100$<br>32(%)<br>(b) $640 + 0.35 \times 640$ OR $640 \times 1.35$<br>864<br>(c) 460000<br>(d) 0.29<br><br>(e) $12.5 - \frac{3}{8} \times 40$<br>-2.5 | M1<br>A1<br>M1<br>A1<br>B1<br>B3<br><br>M1<br><br>A1<br>10 | <br><br><br><br>Allow 460000.0<br>B2 for 0.2858… rounded or truncated, OR<br>B1 for sight of 0.08(1699…)<br>Not for reversed unless answer is correct showing intention. Award SC1 for an answer of 2.5 |
| 2.<br>(a) ¼ or 0.25<br>(b) $14x - 26 = 16$ OR $7x - 13 = 16/2$<br>$14x = 42$ OR $7x = 21$<br>$x = 3$<br>(c) $x + 4 = 6 \times 12$<br>$x = 68$<br>(d) $x < 34/5$ or $x < 6.8$<br>Answer of 6<br>(e) $3x < 30$<br>$x < 10$ | <br>B1<br>B1<br>B1<br>B1<br>M1<br>A1<br>M1<br>A1<br>M1<br>A1<br>10 | Accept embedded answers in (a) , (b) & (c)<br>Accept 2/8<br>FT until 2nd error<br><br><br><br>Or $x/12 = 6 - 4/12$<br><br><br>An answer of 6 implies '<' applied, so M1, A1<br>No marks for '=' unless final replaced to give $x<10$ then award M1, A1. An answer of $x<30/3$ gets M1, AO |
| 3.(a) ½ (12.2 + 14.3) ×9<br>119.25<br>$cm^2$<br>(b) $x + 2x + 3x + 3x = 108$<br>$x = 108/9$ (=12)<br>12(m), 24(m), 36(m) (and 36(m)) | M1<br>A1<br>U1<br>M1<br>A1<br>A1<br>6 | <br><br>Independent mark<br>Idea not notation important, Or alternative first step |
| 4.(a) Correct translation<br>(b) Correct rotation<br><br>(c) Enlargement scale factor 2<br><br>Correct position<br>(d) Correct reflection in x = 1 | B1<br>B2<br><br>B2<br><br>B1<br>B2<br>8 | <br>B1 for a near miss (intention), OR anticlockwise rotation through 90°, OR sight of all 4 × 90° rotations<br>B1 for any 2 lines correct, or for consistent incorrect scale factor used<br><br>B1 for reflection in y = 1 or either axis, OR for the sight of the line x=1 or x = 1 implied, OR reflection in any vertical line indicated |
| 5.(a) $(x^2 =) 13.8^2 - 7.3^2$<br>$x^2 = 137.15$ or $x = \sqrt{137.15}$<br>11.7(….cm) or 12(cm)<br>(b) $y/4.5 = 11.2/8$<br>$y = 6.3$ (cm)<br>$z/8.4 = 8/11.2$<br>$z = 6$ (cm) | M1<br>A1<br>A1<br>M1<br>A1<br>M1<br>A1<br>7 | Showing steps of squaring and subtracting<br><br><br>Scale factor 11.2/8 (=1.4) used appropriately<br><br>Scale factor 11.2/8 (=1.4) used appropriately |

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|---|---|---|
| 6.Shows understanding of summing three consecutive numbers | S1 | Understanding of 'sum', 'consecutive' using numerical or algebraic example to show ×3 middle value<br>Accept x+y+z = 3y as an example of ×3 middle value<br>Do not accept x+x+x=3x or 1x+2x+3x=6x |
| x, x+1, x+2 OR x-1, x, x+1 OR equivalent | M1 | Expressing 3 consecutive numbers algebraically |
| Correct simplified sum of their algebraic terms | A1 | Sum using single variable |
| Convincing conclusion, e.g. 3(x+1) | E1 | If their sum is 3x for middle term x, then award E1 due to their effective use of initial choice |
| Work must be relevant in order to award QWC marks, not engaging with the problem QWC0 | Q<br>W<br>C<br>2 | QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. |
| Look for<br>• clarity of initial text explanation (e.g. writing that 'first number is x'),<br>• the use of notation (watch for the use of '=' being appropriate)<br>• spelling in any initial or final explanation | | QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. |
| QWC2: Candidates will be expected to<br>• present work clearly, with words explaining start, process or steps<br>AND<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer | | QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| QWC1: Candidates will be expected to<br>• present work clearly, with words explaining start, process or steps<br>OR<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer | 6 | |
| 7.(a) 84 - 0.06 × 84 OR 0.94 × 84<br>78.96(kg) or 79(kg) | M1<br>A1 | Do not accept premature approximation 78.9, but FT |
| 78.96 × 0.972 OR 78.96 – 0.028 × 78.96 | M1 | FT their 78.96 or 79 provided the value is <84 |
| 76.7(4912 kg) or 76.7(88kg) or 76.8(kg) or 77(kg) | A1 | Or 76.75 or 76.74<br>*If no marks, then SC1 for an answer of 76.6(08) from a reduction of 8.8%. No FT to (b)* |
| (b) $\frac{(84 - 76.76912)}{84} \times 100$ or equivalent full method | M1 | FT their '76.7', provided ≠ 76.6(08) from 8.8% |
| 8.632…% rounded or truncated from correct working | A1<br>6 | Accept an answer of 8.333..% from using 77kg, or 8.69…% from using 76.7, … |
| 8.Label axes 'length (of tile)' and 'width (of tile)' | B1 | Either order |
| Both scales uniform from 0 to 8 inclusive | B1 | |
| Sight of any two points correct, in list or plotted | M1 | Only one of these point can be (0,8) or (8,0).<br>If only (0,8) and (8,0), then M0 |
| Straight line drawn from (0,8) to (8,0) exclusive | A1<br>4 | Accept including (0,8) and (8,0).<br>Allow if the line touches the axes, but intention clear to end at the axes ±2mm. However, A0 if this line extends much beyond an axis<br>*Treat line from (0,4) to (4,0) as MR-1, with axes 0 to 4 required* |
| 9.(a) Considering 57.96 as 126% | B1 | Or equivalent with 1.26 |
| 57.96/1.26 | M1 | |
| 46 (cm) | A1 | |
| (b) $3.02 \times 10^{14}$ | B2<br>5 | B1 for $3.0248 \times 10^{14}$ or $3.025 \times 10^{14}$<br>or 302 480 000 000 000 or 302 000 000 000 000<br>or 302 500 000 000 000 |

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|---|---|---|
| 10.(a) ½ × 9 × 4<br>= 18 ($cm^2$)<br>(b) Overall strategy: use of ratio and trigonometry<br>9 ÷ 5 (= 1.8)<br>(AP =) 5.4 (cm)<br>Using angle APD = angle PDC<br><br>Tan PDC = 4/5.4<br><br>Angle PDC = $\tan^{-1}$ 0.74074074<br>Angle PDC = 36.5(28855…°) | M1<br>A1<br>S1<br>M1<br>A1<br>B1<br><br>M1<br><br>A1<br>A1<br>9 | <br><br><br>May include extra, ⅖ × 9 or allow ⅗ × 9<br><br><br>OR using angle PDC = 90 – angle ADP<br>OR using perpendicular from P to DC. *Check diagram*<br>FT their '5.4' provided their value is less than 9<br>OR Tan ADP = 5.4/4, must be clear that it is this angle<br>OR Angle ADP = 53.(471…°) |
| 11.Volume hemisphere = 2/3 × Π × $10^3$<br>Realising height of the cone = 10 (cm)<br>Volume of cone = 1/3 × Π × $10^2$ × 10<br>Volume gel = 2/3 × Π × $10^3$ - 1/3 × Π × $10^3$<br><br>Answers in the range 1046.6 to 1048($cm^3$) | M1<br>B1<br>M1<br>M1<br><br>A1<br>5 | ( Answers in the range 2093 to 2095(.238...$cm^3$))<br><br>(Answers in the range 1046.6 to 1048($cm^3$))<br>*Needs to be from a difference consideration, not volume of the cone **and** provided at least M1 previously awarded*<br>CAO |
| 12.(a) 3:5 and 4.5:QR or equivalent, or scale factor 1.5<br>QR = 1.5 × 5 or equivalent<br>PR = 12 (cm)<br>(b) MN = 4.5y<br>DN = 2.5 y<br>( Perimeter =) 3x + 7y | M1<br>A1<br>A1<br>B1<br>B1<br>B1<br>6 | OR 3:8 and 4.5:PR or equivalent<br>OR PR = 4.5 × 8 ÷ 3 or equivalent<br><br><br><br><br>CAO. Must be simplified<br>An answer of ½ (6x + 14y) implies B1, B1, B0 |
| 13.General idea of tan curve and crosses axes at 0°, 180° and 360°<br>Correct sketch tending to infinity correctly at 90° and 270° only | B1<br><br>B2<br>3 | <br><br>B1 for correct sketch with idea of tending to infinity at 90° and 270° only but curving back instead of approaching vertical lines |
| 14.(a) cos A = $\frac{7.2^2 + 5.8^2 - 10.8^2}{2 \times 7.2 \times 5.8}$<br>cos A = -0.373…..<br>111.9(059597…°) or 112°<br>(b) Attempt use of ½ absinC<br>½ × 7.2 × 5.8 × sin 'their A'<br>Answer between 19.35(cm) and 19.4(cm) inclusive | M2<br><br>A1<br>A1<br>M1<br>m1<br>A1<br><br><br>7 | M1 for $10.8^2 = 7.2^2 + 5.8^2 - 2 \times 7.2 \times 5.8 \times \cos A$, OR<br>M1 for 1 slip in rearranged form<br><br>Not for FT of inappropriate rounding or truncation<br>Accept any values for a, b & C, for choice & quote rule<br>'their A' ≠ 7.2, 5.8 or 10.8<br>CAO<br>*Candidates choosing to calculate a different angle first, no marks until they reach the '½absinC' stage then FT for their angle with appropriate sides used.* |
| 15. Equation x(x+8) = y<br>Sight of x(x+8)= y AND y =1284 + x,<br>OR x(x + 8) = x + 1284<br>$x^2 + 7x – 1284 = 0$<br>$x = \{-7 \pm \sqrt{(7^2 - 4 \times 1 \times -1284)}\}/2$<br>$x = \{-7 \pm \sqrt{5185}\}/2$<br>x = 32.5(0347… (and -39.5…)<br>(Dimensions are) 32.5(cm) by 40.5(cm) | B2<br>B1<br><br>B1<br>M1<br>A1<br>A1<br>A1<br><br><br>8 | Allow B1 for sight of x(x + 8)<br>Must be rearranged form y =1284 + x,<br><br>FT from 1 error<br>Allow 1 slip<br><br><br><br>FT for +ve x and x+8 provided M1 awarded, with answer correct to 1 d.p.<br>*Watch for alternative with elimination of x instead of y, and mark accordingly* |



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| Surname | Centre Number | Candidate Number |
|---|---|---|
| Other Names | | 0 |

# GCSE LINKED PAIR PILOT

4364/01

# METHODS IN MATHEMATICS

## UNIT 2: METHODS (CALCULATOR)

## FOUNDATION TIER

P.M. TUESDAY, 19 June 2012

$1\frac{1}{2}$ hours

### ADDITIONAL MATERIALS

A calculator will be required for this paper.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take $\pi$ as 3·14 or use the $\pi$ button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **7**.

| For Examiner's use only | | |
|---|---|---|
| **Question** | **Maximum Mark** | **Mark Awarded** |
| **1** | **13** | |
| **2** | **5** | |
| **3** | **3** | |
| **4** | **6** | |
| **5** | **4** | |
| **6** | **5** | |
| **7** | **7** | |
| **8** | **4** | |
| **9** | **3** | |
| **10** | **5** | |
| **11** | **10** | |
| **12** | **7** | |
| **13** | **8** | |
| **TOTAL MARK** | | |

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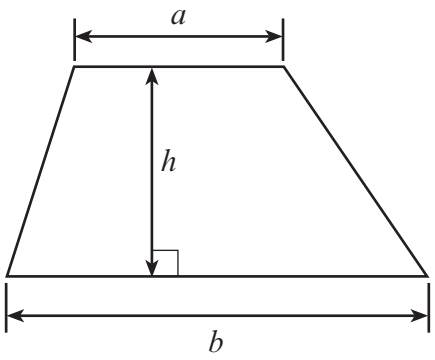
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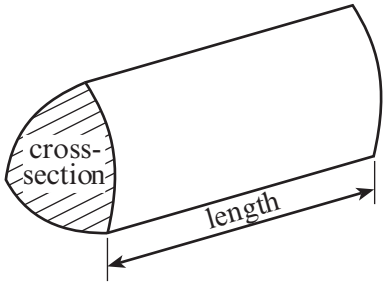
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## Formula List

**Area of trapezium** = $\frac{1}{2}(a + b)h$




**Volume of prism** = area of cross-section × length




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Examiner only

**1.** *(a)* Complete the following table to show equivalent fractions, decimals and percentages.

| Fraction | Decimal | Percentage |
|---|---|---|
| | | 25% |
| | 0·7 | |

[4]

*(b)* Find 38% of 790.

.....

.....

.....

[2]

*(c)* Find $\frac{4}{9}$ of 117.

.....

.....

.....

[2]

*(d)* Faye had 40 scarves, she gave $\frac{1}{4}$ of them to a charity shop and gave 20% of the remaining scarves to friends. How many scarves did Faye have left?

.....

.....

.....

.....

.....

[4]

*(e)* What is the reciprocal of 8?

.....

[1]

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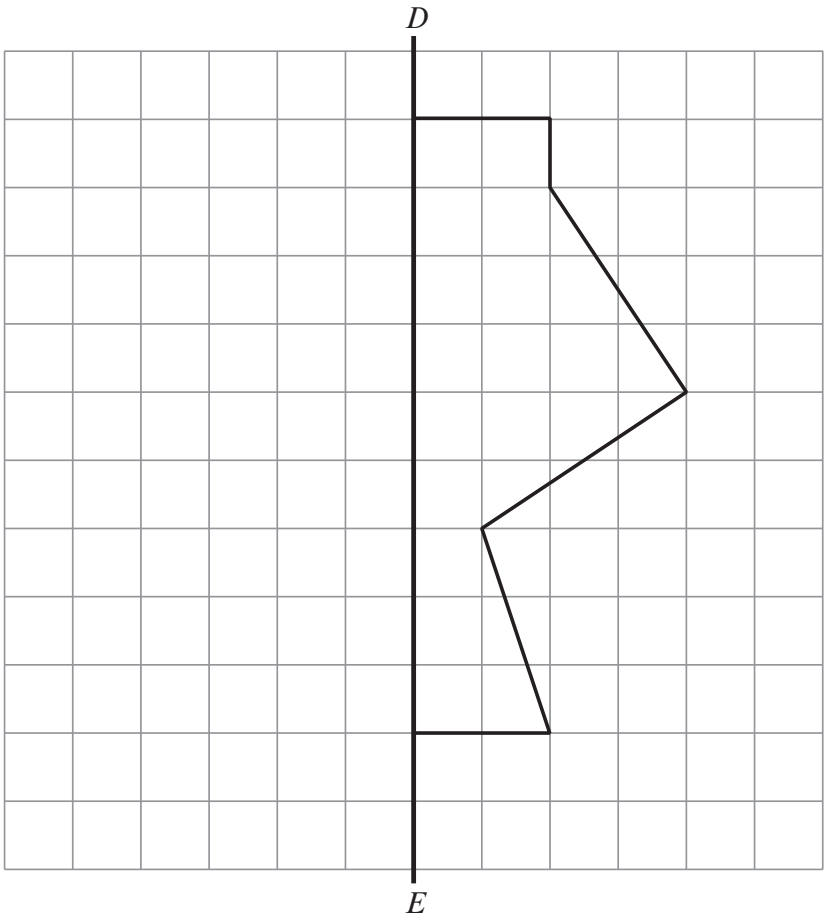




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**2.** *(a)* Complete the following diagram so that $DE$ is a line of symmetry.

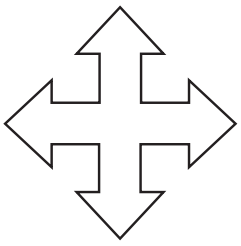



[2]

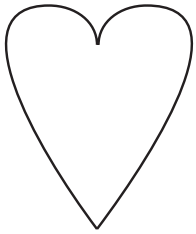
*(b)* In the table below, write for each of the given shapes

- the number of lines of symmetry,
- the order of rotational symmetry.

Shape **A**



Shape **B**



Shape **C**



| | Shape **A** | Shape **B** | Shape **C** |
|---|---|---|---|
| Number of lines of symmetry | | | |
| Order of rotational symmetry | | | |

[3]

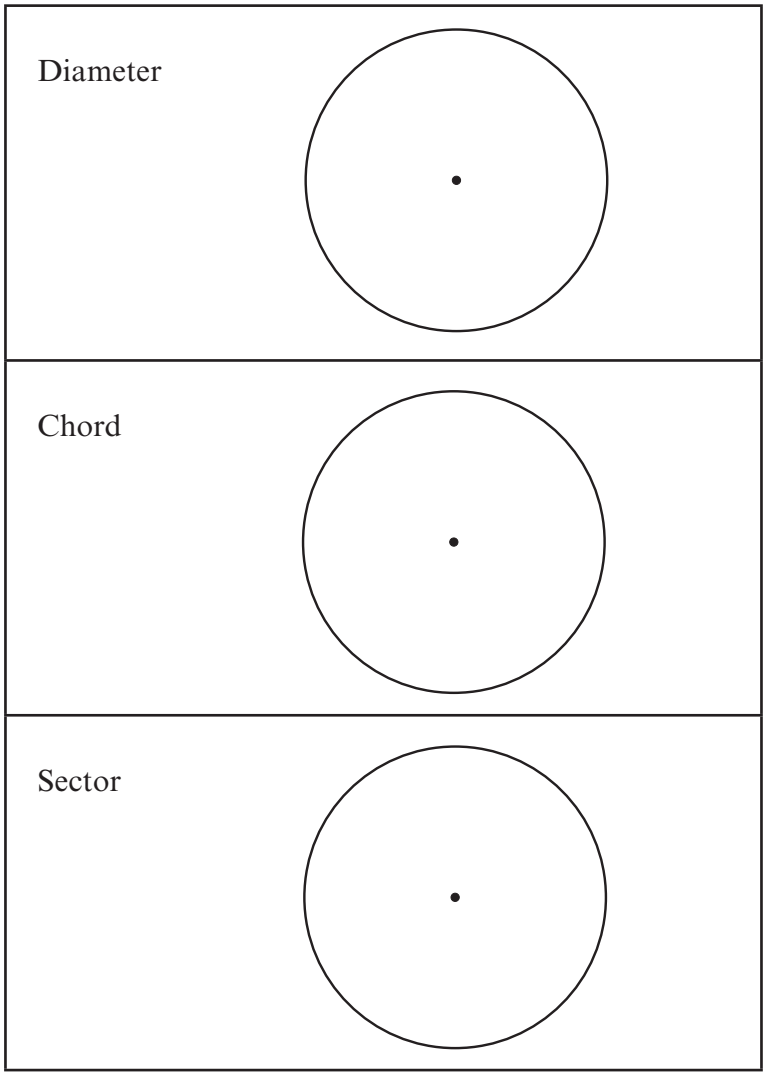
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**3.** On the following diagrams draw lines to show:

- A diameter of a circle.
- A chord of a circle.
- A sector of a circle.




[3]



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**4.** *(a)* Find the perimeter and area of a rectangle with length 11 cm and width 4 cm.

.....

.....

.....

.....

.....

Perimeter = ..... cm Area = ..... $cm^2$ [3]

*(b)* Find the length and width of a rectangle with an area of 20 $cm^2$ and a perimeter of 24 cm.

.....

.....

.....

.....

Length = ..... Width = ..... [3]

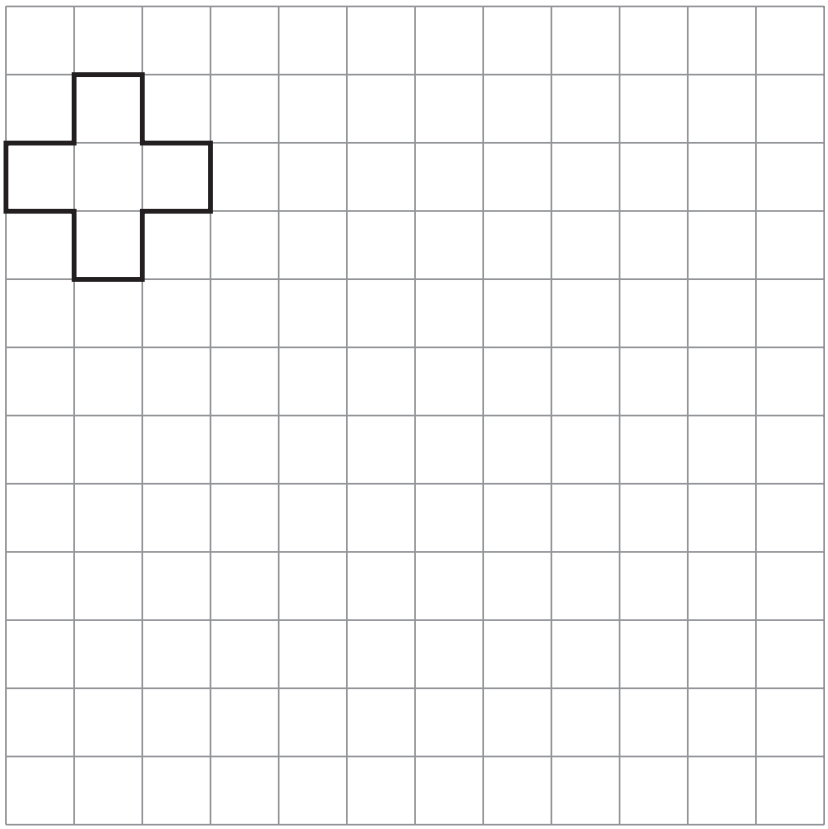
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**5.** Katie does not know the difference between congruent and similar shapes.
Using the given shape, draw further shapes on the centimetre square grid below and explain the difference to Katie.



Explanation:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

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.....

.....

[4]

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**6.** Solve

*(a)* $x + 3 = 19$.

.....

.....

[1]

*(b)* $3x = 18$.

.....

.....

[1]

*(c)* $\frac{x}{7} = 8$.

.....

.....

[1]

*(d)* $3x + 5 = 17$.

.....

.....

.....

.....

[2]

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**7.** *You will be assessed on the quality of written communication in this question.*



Festival of Music

Tickets:
Monday – Friday
Age 15 & over £37.20
Under 15 £25.40

15% off ticket prices for weekend

A group of fourteen Youth Club members want to attend the Festival of Music.
Five of the members are 15 years old.
All the other members are under the age of 15.
How much money will the group save by attending the festival on a weekend rather than a weekday?

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[7]



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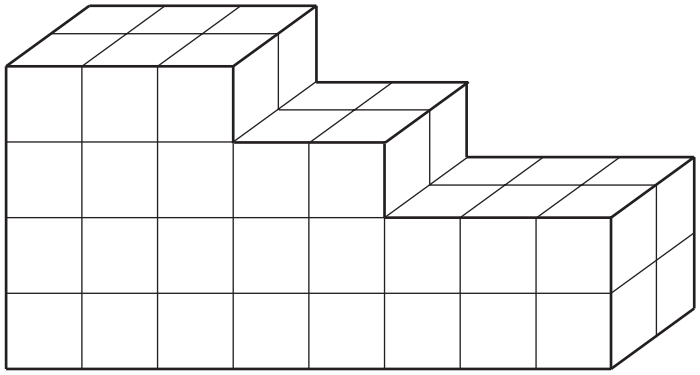


**Turn over.**

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**8.** Plastic 1 cm cubes are used to make the following solid.



All the plastic cubes above are rearranged to make a cuboid.
Showing your working, find possible dimensions for the cuboid.

.....

.....

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.....

.....

Length = ..... cm  Width = ..... cm  Height = ..... cm

[4]

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**9.** Find the value of

*(a)* $\dfrac{128{\cdot}5 \times 4{\cdot}9}{18{\cdot}2 + 7{\cdot}5}$,

.....

.....

[1]

*(b)* $\sqrt{(385{\cdot}76 - 47{\cdot}2)} + 5{\cdot}7^3$.

.....

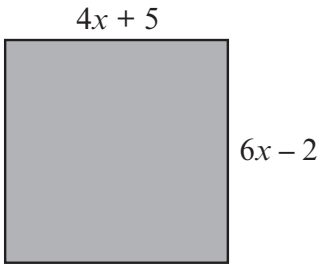
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[2]

**10.** The diagram shows a square.




Find the length of the side of the square.

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.....

[5]

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**11.** In a school there are 160 pupils in Year 10.

*(a)* There are 75 boys in Year 10.
Write down the ratio of girls to boys in its simplest form.

.....

.....

.....

.....

[2]

*(b)* What fraction of the year group are girls?

.....

.....

[1]

*(c)* Last year a ticket to the end of year concert cost £12. This year the ticket price has risen to £15. What is the percentage increase of the price of the ticket?

.....

.....

.....

.....

[2]

*(d)* From the 160 pupils in Year 10, exactly 45% decided to take part in an outdoors activity day.
They are joined by a further 98 pupils from Year 11.
There are a total of 850 pupils in the school.
What fraction of the school will be taking part in the activity day?
Give your answer in its simplest form.

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.....

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.....

[5]

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**12.** *(a)* Huw wrote the following lines of working to solve the equation $3x = 4$.

$$3x = 4$$
$$x = \frac{3}{4}$$
$$x = 0{\cdot}75$$

Huw has made an error.
Explain fully what error was made and give the correct answer.

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.....

.....

[2]

*(b)* Solve $7(5x - 4) = 77$.

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[3]

*(c)* Solve the inequality $6x + 5 < 47$.

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.....

[2]

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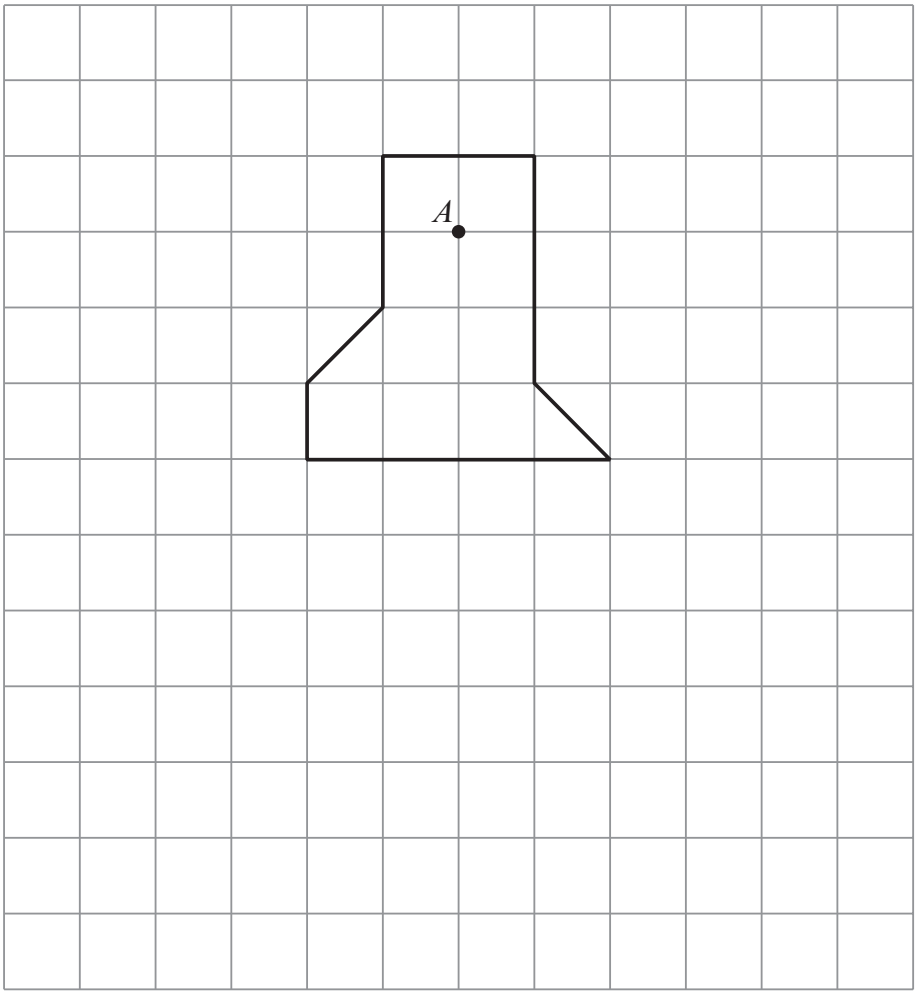


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**13.** *(a)* Enlarge the shape shown on the grid by a scale factor of 2 using $A$ as the centre for the enlargement.



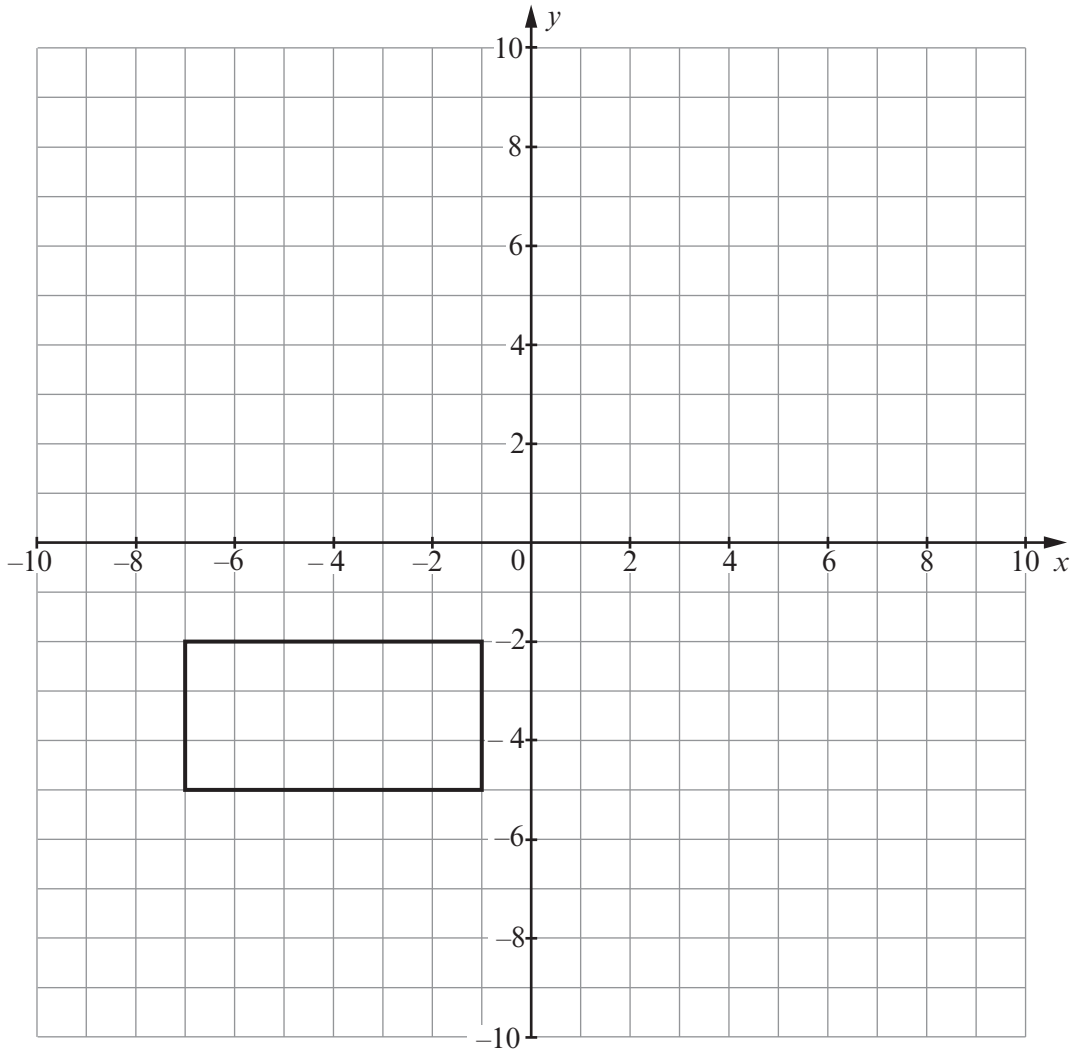

[3]

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*(b)* Reflect the rectangle in the line $y = 2$.



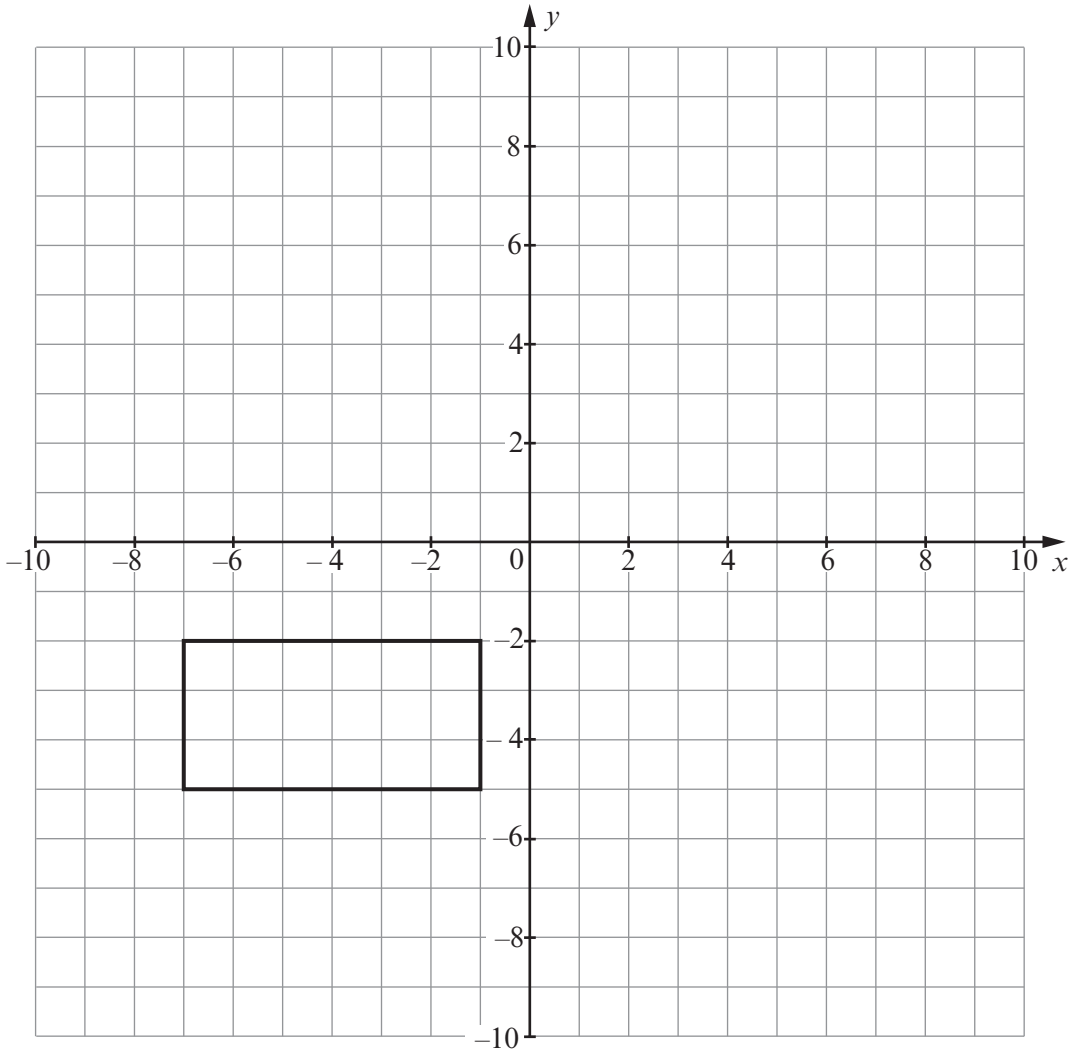

[2]



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*(c)* Translate the rectangle shown below by $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$.




[1]

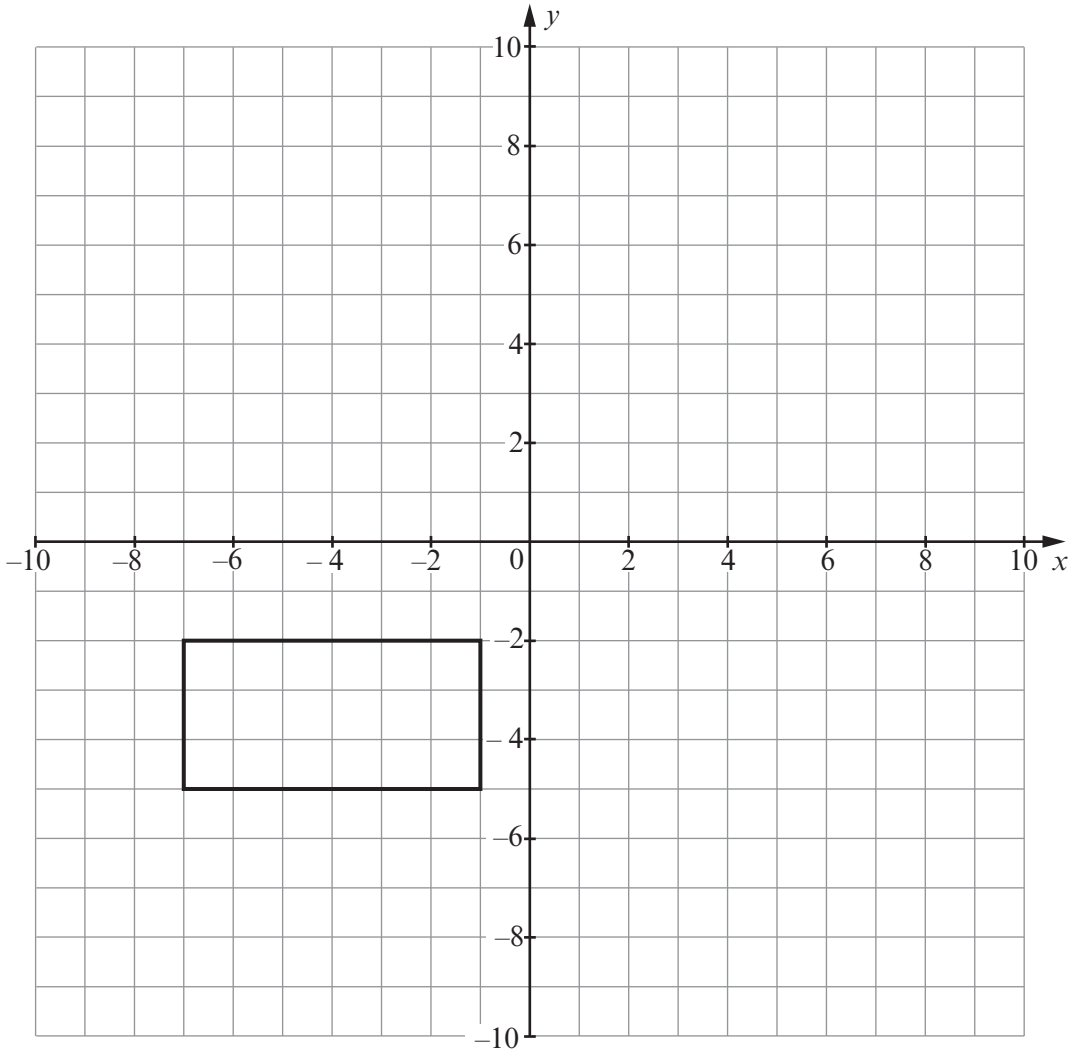
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*(d)* Rotate the rectangle shown on the grid below through 90° clockwise about the origin.




[2]

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# GCSE MARKING SCHEME

## METHODS IN MATHEMATICS (LINKED PAIR PILOT)

## SUMMER 2012

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## INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2012 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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## UNIT 2 (FOUNDATION TIER)

| Methods 2 Foundation June 2012 | | FINAL |
|---|---|---|
| 1.(a)<br>¼ \| 0.25 \| <br>7/10 \| \| 70(%)<br><br>(b) 38/100 × 790<br>300.2<br>(c) 4/9 × 117<br>52<br>(d) ¼ × 40 (= 10)<br>30 scarves left<br>20% of 30 = 6<br>(30 – 6=) 24 left<br><br>(e) 1/8 | B2<br><br>B2<br><br>M1<br>A1<br>M1<br>A1<br>M1<br>A1<br>M1<br>A1<br><br>B1<br>13 | Award B1 for each. Accept equivalent fractions for ¼<br><br>Award B1 for each. Accept equivalent fractions for 7/10<br><br>CAO<br>Or equivalent<br>CAO<br>Or equivalent. Sight of 10 implies M1<br><br>FT 'their 30' or 40<br><br>Award SC3 for 45% of 40 = 18, 40 – 18 = 22<br>Award SC2 for 45% of 40 = 18<br>Award SC1 for 45/100 × 40 |
| 2.(a) Correct diagram<br>(b) 4 1 0<br>4 1 2 | B2<br>B3<br><br>5 | -1 for each incorrect vertex<br>Award B3 for all correct<br>Award B2 for 4 or 5 correct<br>Award B1 for 2 or 3 correct<br>Accept 1 for shape B<br>0 |
| 3.Correct indication of<br>Diameter<br>Chord<br>Sector | <br>B1<br>B1<br>B1<br>3 | |
| 4.(a) Perimeter = 30<br>(Area = ) 4 × 11<br><br>= 44<br>(b) Showing a strategy of trialling a length & width that multiply to 20 **and** would make a perimeter of 24<br><br>(Length =)10(cm) **and** (Width =) 2(cm) | B1<br>M1<br><br>A1<br>M2<br><br><br>A1<br><br>6 | <br>Award M1 for 4 × 11 seen but ward M0 for perimeter = 11 × 4<br><br>Award M1 Showing a strategy of trialling a length & width that multiply to 20 **or** would make a perimeter of 24<br>CAO. Do not penalise if length = 2(cm) and width = 10(cm) |
| 5. Congruent shape drawn<br>Similar shape drawn<br>Correct "Full" explanation given<br>Eg. A congruent shape is exactly the same size and a similar shape is a different size. | B1<br>B1<br>E2<br><br>4 | Do not penalise incorrect labelling for diagrams drawn<br><br><br>E1 for each<br>If own shapes correctly drawn for congruent or similar shapes it must have a correct explanation to get B1 E1 for congruent shapes and/or B1 E1 for similar shapes. |
| 6.(a) $x = 16$<br>(b) $x = 6$<br>(c) $x = 56$<br>(d) $3x = 12$<br>$x = 4$ | B1<br>B1<br>B1<br>B1<br>B1<br>5 | *Accept embedded answers throughout question*<br><br><br><br><br>FT from one error eg 3x = 22<br>x = 22/3 award B0 B1 |

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|---|---|---|
| 7. Cost for 15 year olds (5 × 37.20=) (£)186<br>Cost for under 15s (9 × 25.40=) (£) 228.6(0)<br>Total cost = (£)414.60<br>Saving = 15/100 × 414.60<br>Saving of (£)62.19 | B1<br>B1<br>B1<br>M1<br>A1 | FT their 5 × 37.20 + 9 × 25.40<br><br>Penalise -1 if further workings shown as saving e.g. saving = 414.60 - 62.19 = (£)352.41 |
| <u>Alternative method 3</u><br>Week prices for 15 year olds = 186 B1<br>Week prices for under 15s = 228.6(0) B1<br>Total for week = 414.60 B1<br><br>Weekend prices 15 year olds = 37.20 – (15/100 × 37.20)<br>= (£)31.62<br>Weekend prices for under 15s<br>= 25.40 – (15/100 × 25.40)<br>= 21.59<br>Total cost of weekend = 5 × 31.62 + 9 × 21.59 M1<br>(= 158.10 + 194.31)<br>= 352.41<br><br>Saved (414.60 – 352.41=) 62.19 A1 | | <u>Alternative method 1</u><br>15/100 × 37.20<br>= 5.58<br>15/100 × 25.40<br>= 3.81<br>9 × 3.81 + 5 × 5.58<br>= 62.19<br>Mark as M1 for 15% of either value, A1 for 5.58, A1 for 3.81, B1, B1<br>FT 9 × their 3.81 + 5 × 5.58 provided M1 A1 awarded<br><br><u>Alternative method 2</u><br>15 year olds = 186 B1<br>Under 15's = 228.6(0) B1<br>15/100× 186 or 228.6(0) M1<br>27.90 and 34.29 A1<br>(£)62.19 A1<br>FT if M1 awarded and 2 values shown for 27.90 and 34.29 and one B1 awarded. |
| <u>Notes:</u><br>QWC2 can only be awarded if the correct unit is shown in the final answer.<br>QWC2 requires words throughout the response not just connected to the final answer. | | Watch for misread of<br>9 × 37.20 + 5 × 25.40 = 334.80 + 127 B1 for 334.80, B1 for 127<br>= 461.80 B1<br>15/100 × 461.80 M1<br>= (£)69.27 A1 MR -1 |
| If 0 missing from both 414.60 and 228.60 will lose at least QWC1<br><br>Look for<br>• spelling<br>• clarity of labels<br>• the use of notation (watch for the use of '=', '£' and '0' appropriately used)<br>• 0 missing from both 414.60 and 228.60<br><br>QWC2: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>AND<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer<br><br>QWC1: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>OR<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer | Q<br>W<br>C<br>2 | QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| | 7 | |

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|---|---|---|
| 8. Evidence of trying to count cubes<br><br>Number of cubes = 48<br>Strategy to try to find 3 values that multiply to give 48<br>3 values that multiply to give 48 e.g. $2 \times 6 \times 4$ | M1<br><br>A1<br>S1<br>B1<br>4 | Award M1 if answer 'for 48' in range 44 - 52 inclusive or sight of 24<br><br><br>FT their 48 |
| 9. (a) 24.5<br>(b) 203.593 | B1<br>B2<br><br>3 | Accept 24.50<br>B1 for sight of 18.4 or 185.193. If only 201.5 or 203.6 or 203.59 shown award B1. |
| 10.<br>$6x - 2 = 4x + 5$<br><br>$2x = 7$<br><br>$x = 7/2$ (3.5)<br>Length of side of square = $4 \times 3.5 + 5$ or $6 \times 3.5 - 2$<br>=19 | <br>B1<br><br>B1<br><br>B1<br>M1<br>A1<br>5 | If trials shown award B marks as:<br>B1: for at least 2 sensible trials each substituted into both $4x + 5$ and $6x - 2$.<br>B1: one trial $\geq 3.5$ (that is too big) and one trial $\leq 3.5$ (that is too small)<br>B1 for 3.5<br>Follow through 'their $x$' |
| 11.(a) 85:75<br><br>17:15<br><br>(b) 85/160<br>(c) 3/12 × 100<br>= 25(%)<br>(d) 45/100 × 160<br>= 72<br>(72 + 98 =) 170<br>170/850<br>1/5 | M1<br><br>A1<br><br>B1<br>M1<br>A1<br>M1<br>A1<br>B1<br>B1<br>B1<br>10 | If boys : girls stated, accept 75:85 as M1 and then award A1 for 15:17<br>Award SC1 for 15:17<br><br>ISW<br><br><br><br><br>FT their 72 provided M1 awarded<br><br>FT provided their fraction simplifies |
| 12. (a) Full explanation given<br>Correct version = 4/3 or $1\ ^1/_3$ or 1.33(33333...)<br><br><br>(b) $35x - 28 = 77$ OR $5x - 4 = 77/7$<br>$35x = 105$ $5x = 15$<br>$x=3$<br>(c) $6x < 42$<br>$x<7$ | E1<br>B1<br><br><br>B1<br>B1<br>B1<br>M1<br>A1<br><br><br>7 | Eg. Upside down dividing<br><br>If no marks awarded, award SC1 for $x = 4 \div 3$ or 1.3 as evidence of understanding of error made.<br><br>FT until 2nd error<br>Accept an embedded answer of 3<br><br>No marks for use of "=", unless finally replaced to give $x<7$ then award M1 A1.<br>SC1 for $x<52/6$ ISW |
| 13.(a) Enlargement scale factor 2<br>Correct position<br>(b) Correct reflection in $y = 2$<br><br>(c) Correct translation<br>(d) Correct rotation | B2<br>B1<br>B2<br><br>B1<br>B2<br>8 | B1 for any 3 lines correct, or consistent incorrect scale<br><br>B1 for a reflection in $x=2$ or either axis, OR for sight of the line $y = 2$<br><br><br>B1 near miss, OR anticlockwise rotation |

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## UNIT 2 (HIGHER TIER)

| Methods 2 Higher Summer 2012 | | FINAL |
|---|---|---|
| 1.<br>(a) x = 24×4/3<br>x = 32<br>(b) x = ½ or 0.5 or equivalent<br>(c) 35x – 28 = 77 OR 5x – 4 = 77/7<br>35x = 105 5x = 15<br>x=3<br>(d) 6x < 42<br>x<7<br><br>(e) x > 67/3 or x>22.3…<br>23 | <br>B1<br>B1<br>B1<br>B1<br>B1<br>B1<br>M1<br>A1<br><br>M1<br>A1<br>10 | Accept embedded answers in parts (a), (b) & (c)<br><br>FT from 1 error<br>Mark final answer<br>FT until 2nd error<br><br><br>No marks for use of "=", unless finally replaced to give x<7 then award M1 A1.<br>SC1 for x<52/6 ISW<br>Or sight of 3×22 = 66 with 3×23 =69<br>Accept unsupported 23, or a unique answer of 23 from a trial and improvement method. Do not accept x>23 |
| 2.(a) 5w+w+5w+w or 12w<br>$5w^2$ or 5w×w<br>P = 12w AND A = $5w^2$<br>(b) ½ × 4 × (5 + 9) or equivalent<br>= 28 ($cm^2$) | B1<br>B1<br>B1<br>M1<br>A1<br>5 | Expression B0 for 5w + w × 2 or similar<br>Expression<br>Equations, CAO |
| 3.(a) (432/960) × 100<br>45(%)<br>(b) 820 - 820×24/100 OR 820 × 0.76<br>623.2<br>(c) 1.7<br><br>(e) 635 + …<br>… + 12070<br>= 12705 | M1<br>A1<br>M1<br>A1<br>B3<br><br>B1<br>B1<br>B1<br>10 | Or equivalent full method<br><br>Or equivalent full method<br><br>B2 for 1.71(313…), OR<br>B1 for 2.9(3483…)<br><br><br><br>FT from B1, i.e. either 635 or 12070 correct, with sum of their 2 values calculated correctly |
| 4.(a) Enlargement scale factor 2<br>Correct position<br>(b) Correct reflection in $y = 2$<br><br>(c) Correct translation<br>(d) Correct rotation | B2<br>B1<br>B2<br><br>B1<br>B2<br><br>8 | B1 for any 3 lines correct, or consistent incorrect scale<br><br>B1 for a reflection in $x=2$ or either axis, OR for sight of the line $y = 2$<br><br><br>B1 near miss (±2mm from grid lines), or anticlockwise rotation<br>B0 if rotation shown in all quadrants |
| 5.(a)(i) 2/5<br>(ii) 3/5<br>(b)(i) 4:3<br><br>(ii) (28/49) × 100<br>57.1(%)<br>(c) 1: **2.5** | B1<br>B1<br>B2<br><br>M1<br>A2<br>B1<br>8 | <br>FT 1 – (i)<br>B1 for 28:21 with an attempt to find a common factor, or sight of 1.3•:1 or 1:0.75, or reverse answer 3:4<br>FT their 28, may be 21 used<br>A1 for 57.142857…. rounded or truncated<br>Accept 2 ½. Do not accept 30/12 |

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| 6. Correct use of area cross section or volume,<br>½ × base × 4 ×10 (= 120)<br>(Base of the cross section is) 6(cm)<br>Use of Pythagoras' Theorem $5^2 = 4^2 + (\text{RHS base})^2$<br>RHS base = 3(cm)<br><br>Conclusion e.g. 'small left hand side triangle is also 3cm, 4cm, 5cm (so cross section has two sides of length 5 cm, so it is isosceles)', 'isosceles as 3 is half of 6'<br><br>Look for<br>• spelling<br>• clarity of text explanations and statements<br>• the use of notation<br>• units, cm, $cm^2$ and $cm^3$<br><br>For QWC2 there must be sufficient process steps shown, with text connecting throughout, or in full summary within a conclusion. Also units must be shown.<br><br>Candidates not showing two stages working with the problem do not have sufficient process steps to be awarded QWC2.<br><br>QWC2: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>AND<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer<br><br>QWC1: Candidates will be expected to<br>• present work clearly, with words explaining process or steps<br>OR<br>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer | M1<br><br>A1<br>M1<br>A1<br><br>E1<br><br>Q<br>W<br>C<br>2<br><br>7 | OR M1 for finding the area of the cross section $12(cm^2)$<br>Accept as a reverse calculation, i.e. using 6cm to show volume $120(cm^3)$ or area $12(cm^2)$<br>Accept M1, A1 if $4^2 + 3^2$ used to show side 5cm, or<br>M1, A1 for reference to 3, 4, 5 triple<br><br>Depends on **all** previous marks<br><br>**If M1, A1 for base 6(cm),<br>but M0, A0 or M1, A0 for Pythagoras' Theorem & E0 then possible award of:<br>*SC1 for clear conclusion that it is an isosceles and its dimensions are (5cm,) 5cm with base 6cm*<br>*OR*<br>*SC1 for a clear conclusion that it is not isosceles based on incorrect use of, or an error in using Pythagoras' Theorem*<br><br>QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.<br><br>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar<br>OR<br>evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.<br><br>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| 7. $5x + x/4 = 18.9$<br>$20x + x = 4 \times 18.9$ OR $21x/4 = 189$<br><br>$21x = 75.6$<br>$x = 3.6$ | B1<br>B1<br><br>B1<br>B1<br><br>4 | FT until 2nd error<br>FT provided similar format, equivalent level of difficulty<br>Accept FT from $5x + ¼ = 18.9$, giving $5x = 18.9 – ¼$<br><br>CAO<br>*If B0, and similar level of difficulty but trial and improvement used, check their answer in their equation, if correct then award SC2. If SC2 not awarded, then for 2 correctly evaluated trials, 1 either side of the required value award SC1* |

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|---|---|---|
| 8. Area of circle = $\pi \times 8.2^2$ (211.(…))<br>Area of square = $23.4^2$ or $23.4 \times 23.4$ (547.56)<br>Area remaining, between 336.3 to 336.5($cm^2$) inclusive<br>Percentage = (area remaining/ $23.4^2$) × 100<br>= 61(.4… %) | M1<br>M1<br>A1<br>M1<br>A1<br><br><br><br><br><br>5 | <br><br>CAO<br>FT their area remaining provided at least M1<br>CAO<br>*Alternative:*<br>*M1 Area of circle = $\pi \times 8.2^2$ (=211.(...))*<br>*M1 area of square = $23.4^2$ (=547.56)*<br>*A1 $\pi \times 8.2^2$ / $23.4^2$ (×100) correctly evaluated, 0.38, 0.385… and 0.386, or 38, 38.5, 38.6 or 39 (or as percentages) CAO*<br>*M1 % remaining = 100×(1 - Area circle / Area square) (FT areas provided at least M1 awarded) or 1 – 38.5 or 38.6 or 39*<br>*A1 61.(4..%) CAO* |
| 9.(a) cos x = 25.8/62.3<br>65.5(3576…°) rounded or truncated<br><br><br>(b) z = 14.3 × tan 34<br>9.6(454..) or 9.65 | M1<br>A2<br><br><br>M1<br>A1<br>5 | <br>A1 for $\cos^{-1}$ 0.4(141…)<br>65.8 comes from premature rounding, award M1 and A1 implied<br><br><br>If 9.6… seen in working, award M1 A1, however if not seen and incorrectly rounded then M1, A0.<br>An answer of 9.64 or 9.8 from correct working is M1, A0<br>An unsupported answer of 9 gets M0, A0. |
| 10.( a)(i) 230 × 100 × 10 or 230 000<br>$2.3 \times 10^5$<br><br>(ii) 8 × 6 ÷ 3<br>16 (days)<br>(b) T = xd/w | B1<br>B1<br><br>M1<br>A1<br>B3<br>7 | <br>FT 'their 230 000', but not 230, **correctly** expressed in standard form<br><br><br><br>B2 for xd/w or T = xd/… or T = xd × …<br>B1 for sight of xd |
| 11. Sight of 9.6÷7.8 or 9.8/(3.25 + 4.55)<br>or 9.6÷2.4 or 9.6×0.416(66..) or equivalent<br><br><br><br>AB = 4(cm)<br>BC = 5.6(cm) | B2<br><br><br><br><br>B1<br>B1<br><br><br><br>4 | May be within a calculation or implied<br>(2.4 = 7.8/3.25 and 0.4166… = 3.25/7.8)<br>B1 for sight of 3.25:4.55 (or 5:7) or 3.25:7.8<br>or AB/BC = 3.25/4.55 or AB/9.6 = 3.25/(3.25+4.55) or equivalent<br><br><br>*Alternative method:*<br>*B1 x/(9.6-x) = 3.55/4.55 or simplified versions*<br>*B1 4.55x = 3.25(9.6 – x) or equivalent rearrangement*<br>*B1 AB = 4(cm)*<br>*B1 BC =5.6(cm)* |
| 12.(a) y = 8 – x OR x = 8 - y<br>$3x^2 + x(8-x) + 6 = 0$ $3(8-y)^2 + (8-y)y + 6 = 0$<br>$2x^2 + 8x + 6 = 0$ $2y^2 – 40y + 198 = 0$<br><br>(x + 1)(x+3) = 0 (y -11)(y -9) = 0<br><br>x = -1, x = -3 OR y = 11, y =9<br>y = 9, y = 11 x = -3, x = -1<br><br>(b) $x = \{ -5 \pm \sqrt{(5^2 - 4\times2\times-4)}\} / 2\times2$<br>$x = \{ -5 \pm \sqrt{57}\} / 4$<br>0.64 and -3.14 | M1<br>M1<br>A1<br><br>m1<br><br>A1<br>A1<br><br>M1<br>A1<br>A1<br>9 | <br>Allow 1 error in substitution<br>Or by halving $x^2 + 4x + 3 = 0$ OR $y^2$ -20y +99=0<br>FT equivalent level of difficulty provided M1<br>Or alternative method to solve , e.g. formula with correct substitution and $b^2$-4ac correct simplified<br><br>OR *SC1* for x= -1, y=9 **OR** x= -3, y=11<br><br>Allow 1 slip in substitution. Must be correct formula |
| 13. Idea to work with £90.27 as 85%<br>or considering the 2nd step as 118% of original price<br>90.27÷0.85 or equivalent<br>106.2(0)<br>106.2(0)÷1.18<br>(£)90 | S1<br><br>M1<br>A1<br>M1<br>A1<br>5 | <br><br>Maybe implied in further working<br><br>FT their 106.2(0) provided >90.27<br> |

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| 14.(a) Idea of right angled triangle shown or used with height b, base a<br>$\sin\theta = b(/1)$<br>$\tan\theta = b/a$<br>(b) Use of Pythagoras' Theorem<br>$x^2 + y^2 = 1$ or $x^2 = 1 - y^2$ or $y^2 = 1 - x^2$ | M1<br><br>A1<br>A1<br>M1<br>A1<br>5 | Either answer correct implies M1<br><br>Or $b/\sqrt{(a^2 + b^2)}$<br><br>M1 for $a^2 + b^2 = 1$ or $x^2 + y^2 = r^2$<br>CAO. Correct equation in any form |
| 15. $AC^2 = 8.2^2 + 7.6^2 - 2\times8.2\times7.6\times\cos42$<br>$AC^2 = 32(.37\ldots)$<br>AC = 5.689.. or 5.7 (cm)<br>$\frac{1}{2}\times8.2\times7.6\times\sin42 + \frac{1}{2}\times9.7\times AC\times\sin48$<br>Answers in the range 41.35 ($cm^2$) to 41.4($cm^2$) inclusive | M1<br>A1<br>A1<br>M1<br>A1<br>5 | <br><br><br>FT their AC, but not 8.2, 7.6 or 9.7 (20.85… + 20.50…) |
| 16. **AB** = 2**x** – **y**<br>Parallel<br>**CD** twice length **AB** OR **AB** is ½ length **CD** | M1<br>A1<br>A1<br>3 | |



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