EDEXCEL GCSE MATHEMATICS (MODULAR 2381)

# MATHS



## EXAM QUESTION PACK

UNIT 2 STAGE 2 (PAPER 10) HIGHER TIER 5383H PAPERS

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| Centre No. | | | | | | Paper Reference | | | | | | | | Surname | Initial(s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Candidate No. | | | | | | 5 | 3 | 8 | 3 | H | / | 1 | 0 | Signature | |

Paper Reference(s)

**5383H/10**

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Team Leader's use only

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# Edexcel GCSE

## Mathematics (Modular) – 2381

Paper 10 (Calculator)

# Higher Tier



Unit 2 Stage 2

Thursday 17 November 2011 – Afternoon

Time: 30 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

**Items included with question papers**
Nil

## Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
**You must NOT write on the formulae page.**
**Anything you write on the formulae page will gain NO credit.**
If you need more space to complete your answer to any question, use additional answer sheets.

## Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 10 questions in this question paper. The total mark for this paper is 25.
There are 12 pages in this question paper. Any blank pages are indicated.
**Calculators may be used.**
If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

## Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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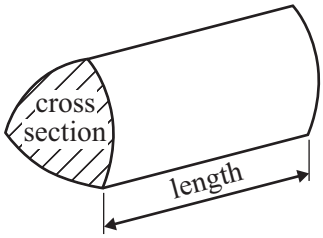
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**GCSE Mathematics 2381**

Formulae: Higher Tier

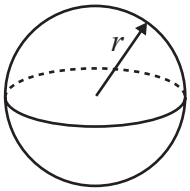
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

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



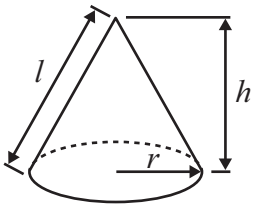

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

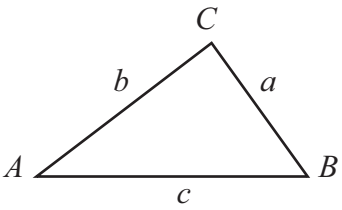



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle *ABC***




**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc\cos A$

**Area of triangle** $= \frac{1}{2}ab\sin C$

**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$



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**Answer ALL TEN questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**1.** Simplify $3c + 2d - c - 6d$

.....

**(Total 2 marks)**

**Q1**

**2.** Simplify $2^3 \times 2^5$

Give your answer as a power of 2

.....

**(Total 1 mark)**

**Q2**

**3.** Work out 17.5% of £720

.....

**(Total 2 marks)**

**Q3**

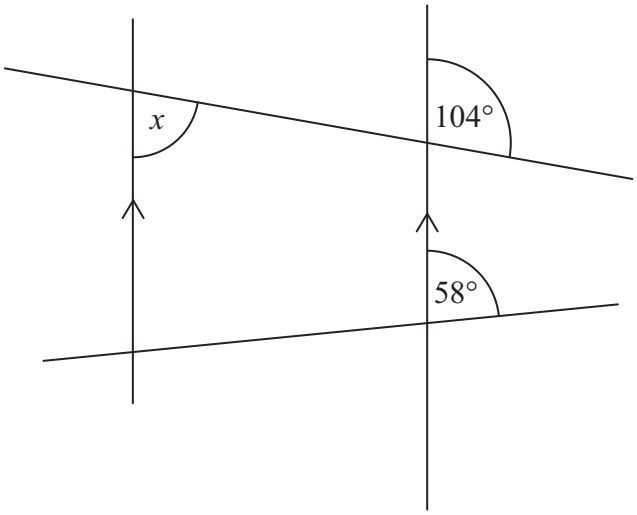


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**4.**

Diagram **NOT** accurately drawn




(i) Work out the size of the angle marked $x$.

.....°

(ii) Give reasons for your answer.

.....

.....

**Q4**

**(Total 2 marks)**

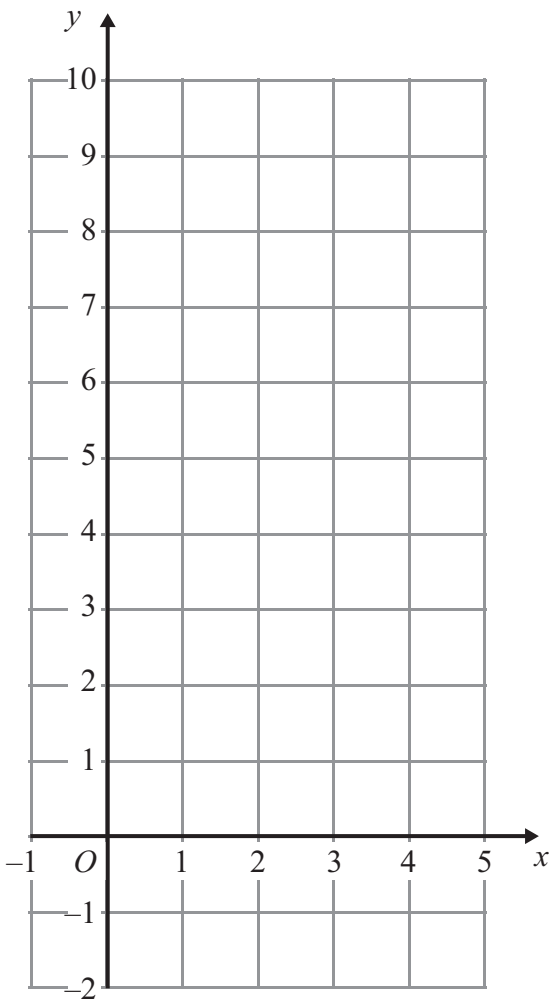


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**5.** On the grid, draw the graph of

$$2x + y = 8$$




Q5

**(Total 3 marks)**



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**6.** The table gives information about the density of some metals.

| Metal | Density (kg/m$^3$) |
|---|---|
| Aluminium | 2600 |
| Brass | 8500 |
| Copper | 8900 |
| Iron | 7900 |
| Steel | 7500 |

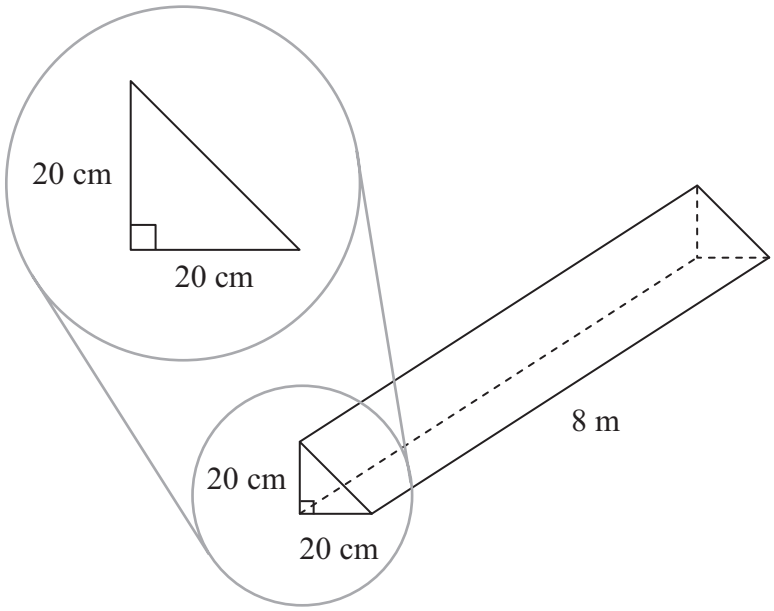



Diagram **NOT** accurately drawn

The diagram shows a solid metal bar made in the shape of a triangular prism.



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The base of the triangle is 20 cm.
The height of the triangle is 20 cm.

The length of the bar is 8 m.
The mass of the bar is 1424 kg.

The bar is made from one of the five metals in the table.
Which metal?

You must show your working.

.....

**(Total 3 marks)**

**Q6**

**7.** Use your calculator to work out

$$\sqrt{2.3 \times 4.6^2}$$

Give your answer as a decimal.

Write down all the figures on your calculator display.

.....

**(Total 2 marks)**

**Q7**



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**8.** (a) Simplify $\dfrac{3(x+1)^2}{x+1}$

.....

**(1)**

(b) Simplify $\dfrac{4x^2y}{6x}$

.....

**(2)** **Q8**

**(Total 3 marks)**

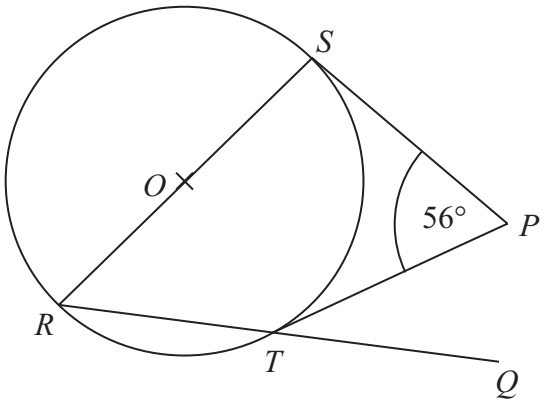


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**9.**

Diagram **NOT** accurately drawn




*R*, *S* and *T* are points on a circle, centre *O*.
*PS* and *PT* are tangents to the circle.

*SR* is a diameter.
Angle *SPT* = 56°.

*Q* is a point such that *RTQ* is a straight line.

Work out the size of angle *PTQ*.

.....°

**Q9**

**(Total 4 marks)**



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**10.** Simplify $\dfrac{2x^2 + 3xy + y^2}{x^2 - y^2}$

.....

**Q10**

**(Total 3 marks)**

**TOTAL FOR PAPER: 25 MARKS**

**END**



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# Mark Scheme (Results)

## November 2011

## GCSE Mathematics (2381)
## Paper 5383H_10 (Calculator)

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Ask The Expert can be accessed online at the following link:

http://www.edexcel.com/Aboutus/contact-us/

November 2011

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**NOTES ON MARKING PRINCIPLES**

**1 Types of mark**

M marks: method marks
A marks: accuracy marks
B marks: unconditional accuracy marks (independent of M marks)

**2 Abbreviations**

cao – correct answer only
isw – ignore subsequent working
oe – or equivalent (and appropriate)
indep - independent
ft – follow through
SC: special case
dep – dependent

**3 No working**

If no working is shown then correct answers normally score full marks
If no working is shown then incorrect (even though nearly correct) answers score no marks.

**4 With working**

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

**5 Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

**6 Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

**7 Probability**

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

**8 Linear equations**

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

**9 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

**10 Money notation**

Accepted with and without the “p” at the end.

**11 Range of answers**

Unless otherwise stated, when any answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1).

| 5383H_10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | | | $2c - 4d$ | 2 | B2 cao<br>(B1 for $2c$ or $-4d$) |
| 2 | | | $2^8$ | 1 | B1 cao |
| 3 | | $720 \times \frac{17.5}{100}$<br><br>OR<br><br>72 + 36 + 18 | £126 | 2 | M1 for $720 \times \frac{17.5}{100}$ oe<br>A1 cao<br><br>OR<br><br>M1 for a complete method to build up to 17.5%, eg 72 + 36 + 18, 72 + 36 +7.2 + 7.2 + 3.6<br>A1 cao<br><br>SC B1 for (£)846 or (£)594 |

| 5383H_10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 4 | (i) | | 76 | 2 | B1 cao |
| | (ii) | | Full reasons | | B1 for angles (on a) straight line (add up to) $180^o$ **and**<br>either corresponding angles (are equal) or alternate angles (are equal)<br>OR<br>vertically opposite angles (are equal)<br>**and** co-interior angles/allied angles (add up to) $180^o$<br>OR<br>vertically opposite angles (are equal)<br>**and** corresponding angles (are equal)<br>**and** angles (on a) straight line (add up to) $180^o$ |

| 5383H_10 | | | | | |
|---|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** | |
| 5 | <table><tr><td>–1</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>10</td><td>8</td><td>6</td><td>4</td><td>2</td><td>0</td><td>−2</td></tr></table> | Correct straight line graph drawn | 3 | **(Table of values)**<br>M1 for at least 2 correct attempts to find points by substituting values of $x$.<br>M1 ft for plotting at least 2 of their points (any points plotted from their table must be correct)<br>A1 for correct line between 0 and 4<br>OR<br>**(No table of values)**<br>M2 for at least 2 correct points (and no incorrect points) plotted or line segment of $2x + y = 8$ drawn (ignore any additional incorrect segments)<br>(M1 for at least 3 correct points with no more than 2 incorrect points)<br>A1 for correct line between 0 and 4<br>OR<br>**(Use of $y$=m$x$+c)**<br>M2 for line segment of $2x + y = 8$ drawn (ignore any additional incorrect segments)<br>(M1 for line drawn with gradient of −2 OR line drawn with a $y$ intercept of 8 and a negative gradient)<br>A1 for correct line between 0 and 4 | |

| 5383H_10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 6 | | $0.2 \times 0.2 \times 8 \div 2 = 0.16$ m$^3$<br>1424 ÷ 0.16 = 8900 | Copper | 3 | M1 for attempt to use consistent units and calculate volume<br>eg $'0.2' \times '0.2' \times 8 \div 2$ (=0.16) or<br>$20 \times 20 \times '800' \div 2$ (=160000)<br>M1 for attempt to divide mass by volume, 1424 ÷ '0.16'<br>A1 8900 and Copper<br><br>OR<br><br>M1 for attempt to use consistent units and calculate volume<br>eg $'0.2' \times '0.2' \times 8 \div 2$ (=0.16) or<br>$20 \times 20 \times '800' \div 2$ (=160000)<br>M1 for attempt to multiply density by volume, 8900 × '0.16'<br>A1 1424 and Copper |
| 7 | | 2.3 × 21.16 = 48.668<br>√(48.668) | 6.9762… | 2 | M1 for use of bidmas eg 21.16, $\frac{529}{25}$, 48.668 , 48.6, 48.7, 48.66, 48.67, or $\frac{12167}{250}$<br>A1 6.9762…. |

| 5383H_10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 8 | (a) | | $3(x + 1)$ | 1 | B1 for $3(x+1)$ or $3x + 3$ |
| | (b) | $\frac{4x^2y}{6x}$ | $\frac{2xy}{3}$ | 2 | B2 for $\frac{2xy}{3}$<br>(B1 for $\frac{4xy}{6}$ or $\frac{2x^2y}{3x}$) |
| 9 | | Join *O* to *T*<br>Angle *OTP* = 90°<br>Angle *SOT* = 124°<br>Angle *OTR* = 62°<br>Angle *PTQ* = 28°<br><br>OR<br>Join *S* to *T*.<br>Angle *RTS* = 90°<br>Angle *STP* = 62°<br>Angle *PTQ* = 28° | 28 | 4 | M1 for Angle *OTP*= 90 or angle *OSP* = 90, can be marked on diagram<br>M1 for correct method to find angle *OTR*<br>eg (180 – 56) ÷ 2 or 62 seen, can be marked on diagram<br>M1 for Angle *PTQ* = (180 – 90 – '62')<br>A1 cao<br>OR<br>M1 for Angle *RTS* = 90 or angle *STQ* = 90, can be marked on diagram<br>M1 for correct method to find angle *STP*<br>eg (180 – 56) ÷ 2 or 62 seen, can be marked on diagram<br>M1 Angle *PTQ* = (90 – '62')<br>A1 cao |
| 10 | | $\frac{(2x + y)(x + y)}{(x - y)(x + y)}$ | $\frac{(2x + y)}{(x - y)}$ | 3 | B1 for $(2x + y)(x + y)$<br><br>B1 for $(x - y)(x + y)$<br>B1 for $\frac{(2x + y)}{(x - y)}$ or $\frac{2x + y}{x - y}$ |

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| Candidate No. | | | | | | 5 | 3 | 8 | 3 | H | / | 1 | 0 | Signature | |

Paper Reference(s)

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# Edexcel GCSE

## Mathematics (Modular) – 2381

Paper 10 (Calculator)



# Higher Tier

Unit 2 Stage 2

Monday 13 June 2011 – Afternoon

Time: 30 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

**Items included with question papers**
Nil

## Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
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Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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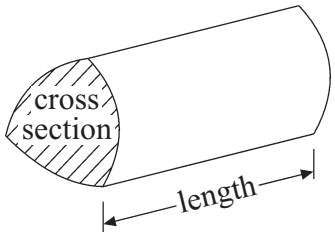
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**GCSE Mathematics 2381**

Formulae: Higher Tier

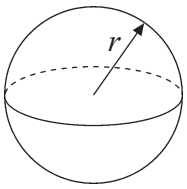
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

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



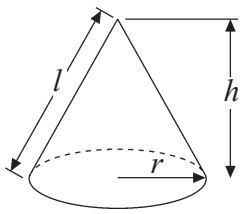

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

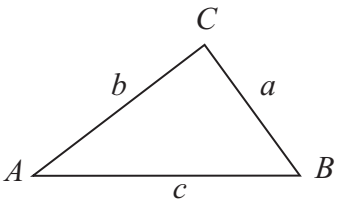



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle ABC**




**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc\cos A$

**Area of triangle** $= \frac{1}{2}ab\sin C$

**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$



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**Answer ALL NINE questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**1.** Simplify $4a + 3b + 2a - 7b$

..... **Q1**

**(Total 2 marks)**

**2.** Hasan is a salesman.
Each week he is paid £400 plus 7.5% of his weekly sales.
Last week, his weekly sales were £3600

Work out how much Hasan was paid last week.

£ ..... **Q2**

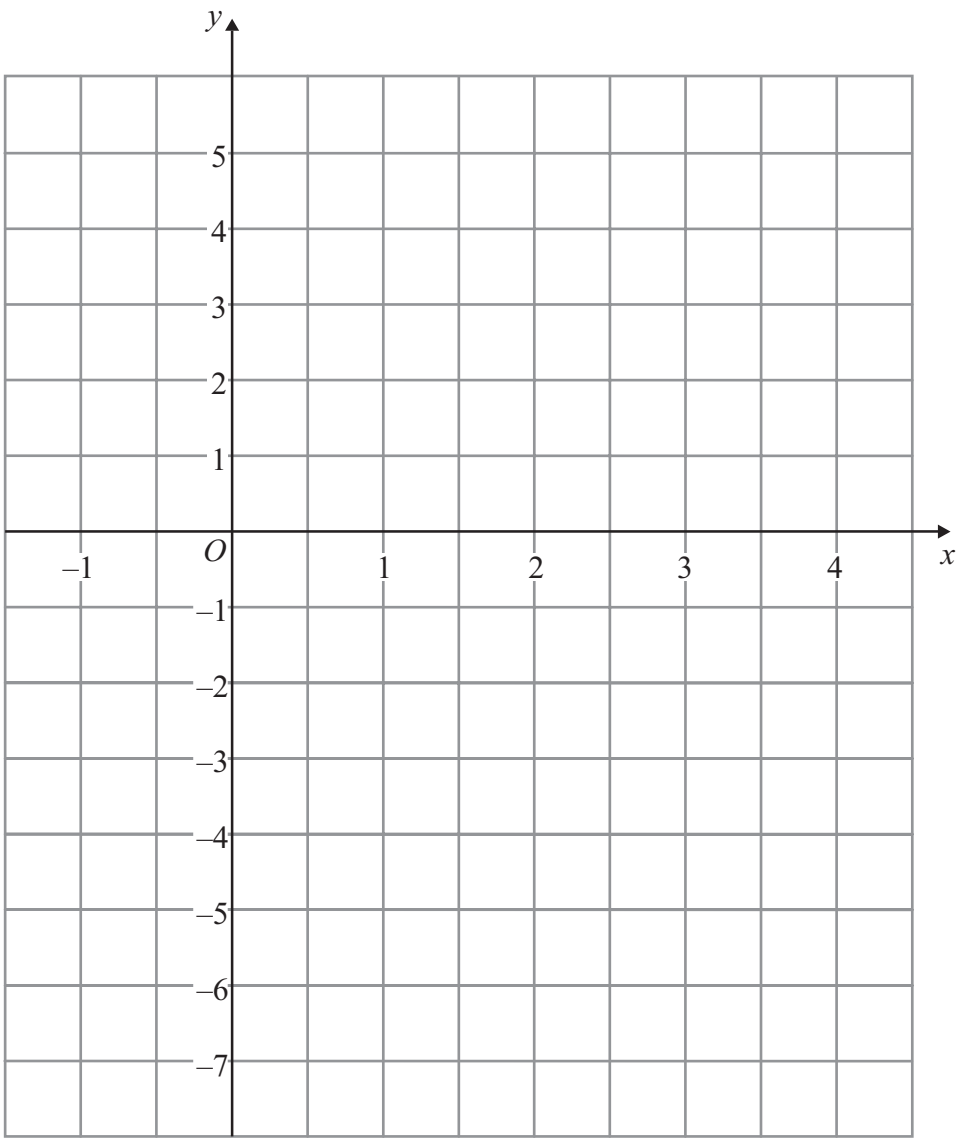
**(Total 3 marks)**



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**3.** On the grid, draw the graph of $y = 2x - 4$ for values of $x$ from $x = -1$ to $x = 4$




**Q3**

**(Total 3 marks)**



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**4.**

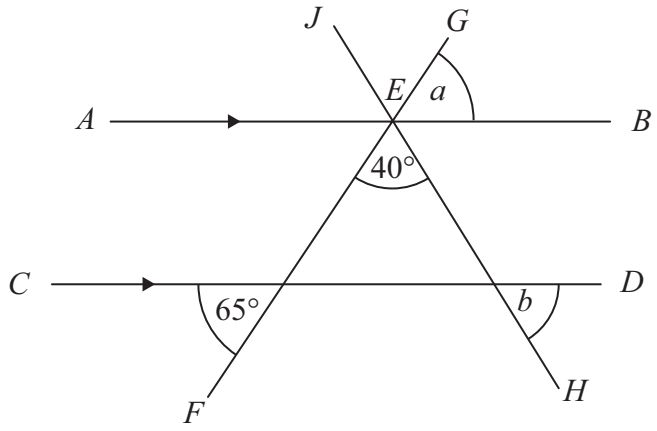



Diagram **NOT** accurately drawn

*FG* and *HJ* are straight lines which cross at *E*.
The lines *AEB* and *CD* are parallel.

(a) (i) Write down the size of angle *a*.

.....°

(ii) Give reasons for your answer.

.....

.....

**(2)**

(b) Work out the size of angle *b*.

.....°

**(2)**

**Q4**

**(Total 4 marks)**



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Leave blank

**5.** (a) Expand and simplify $(x + 5)(x - 2)$

.....

**(2)**

(b) Factorise $a^2 - 25b^2$

.....

**(1)**

**Q5**

**(Total 3 marks)**

**6.** Work out $(2.7 \times 10^6) \times (2.85 \times 10^3)$

Give your answer in standard form.

.....

**Q6**

**(Total 2 marks)**



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Leave blank

**7.**

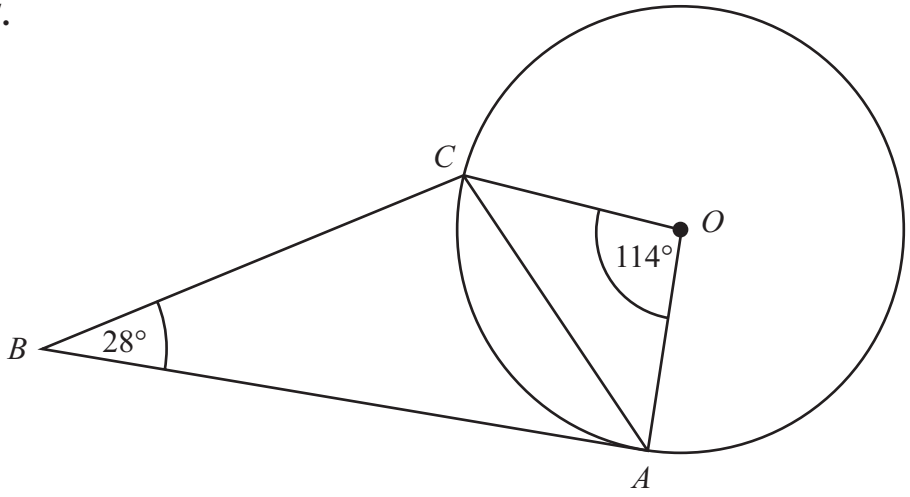



Diagram **NOT** accurately drawn

*A* and *C* are points on the circumference of a circle, centre *O*.
*BA* is a tangent to the circle.

Angle *ABC* = 28°
Angle *AOC* = 114°

Work out the size of angle *ACB*.

..... °

**Q7**

**(Total 3 marks)**



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Leave blank

**8.** Prove algebraically that the recurring decimal $0.\dot{2}\dot{8}$ can be written as the fraction $\frac{28}{99}$

**Q8**

**(Total 2 marks)**

**9.** Write $\frac{5}{x+1} - \frac{2}{x-1}$ as a single fraction in its simplest form.

.....

**Q9**

**(Total 3 marks)**

**TOTAL FOR PAPER: 25 MARKS**

**END**



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# Mark Scheme (Results)

## June 2011

## GCSE Mathematics (5383H)
## Paper 10 (Calculator)

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**NOTES ON MARKING PRINCIPLES**

**1 Types of mark**

M marks: method marks
A marks: accuracy marks
B marks: unconditional accuracy marks (independent of M marks)

**2 Abbreviations**

cao – correct answer only
isw – ignore subsequent working
oe – or equivalent (and appropriate)
indep - independent
ft – follow through
SC: special case
dep – dependent

**3 No working**

If no working is shown then correct answers normally score full marks
If no working is shown then incorrect (even though nearly correct) answers score no marks.

**4 With working**

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

**5 Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

**6 Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

**7 Probability**

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

**8 Linear equations**

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

**9 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

**10 Money notation**

Accepted with and without the “p” at the end.

**11 Range of answers**

Unless otherwise stated, when any answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1).

| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | | $6a - 4b$ | 2 | B2 cao<br>(B1 for $6a$ or $-4b$ or 4b seen) |
| 2 | | 670 | 3 | M1 for $\frac{7.5}{100} \times 3600$ or $7.5 \times 36$ or $360 \div 4 \times 3$ or $180 + 72 + 18$ or $3600 \times 0.075$<br>A1 for 270<br>A1ft (dep on M1) for 400 + '270'<br>SC B1 for answer of 427 |
| 3 | $x$ \| –1 \| 0 \| 1 \| 2 \| 3 \| 4<br>$y$ \| –6 \| –4 \| –2 \| 0 \| 2 \| 4 | Correct line | 3 | **(Table of values)**<br>M1 for at least 2 correct attempts to find points by substituting values of $x$.<br>M1 ft for plotting at least 2 of their points (any points plotted from their table must be correct)<br>A1 for correct line between -1 and 4<br><br>**(No table of values)**<br>M2 for at least 2 correct points (and no incorrect points) plotted OR line segment of $2x$-4 drawn (ignore any additional incorrect segments)<br>(M1 for at least 3 correct points with no more than 2 incorrect points)<br>A1 for correct line between -1 and 4<br><br>**(Use of $y$=m$x$+c)**<br>M2 for at least 2 correct points (and no incorrect points) plotted OR line segment of $2x$-4 drawn (ignore any additional incorrect segments)<br>(M1 for line drawn with gradient of 2 OR line drawn with a $y$ intercept of -4)<br>A1 for correct line between -1 and 4 |

| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 4 (a)(i) | | 65 | 2 | B1 cao |
| (ii) | | Corresponding angles and vertically opposite angles | | B1 corresponding angles (or F angles) **and** (vertically) opposite angles or any correct description of a combination of reasons that will lead to the correct answer e.g. (vertically) opposite followed by alternate (Z angle) followed by (vertically) opposite |
| (b) | 180 – (40 + 65) | 75 | 2 | M1for 180 – (40 + 65)<br>A1 cao<br>Or<br>M1 for 180 – 40 –"a"<br>A1 ft if their $a > 50$ |
| 5 (a) | $x^2 + 5x – 2x –10$ | $x^2 + 3x – 10$ | 2 | M1 for all 4 terms correct ignoring signs or for 3 out of 4 terms from $x^2$, $+ 5x$, $– 2x$ and $–10$<br>A1 for $x^2 + 3x – 10$ oe |
| (b) | | $(a + 5b)(a – 5b)$ | 1 | B1 for $(a + 5b)(a – 5b)$ oe |
| 6 | | $7.695\times10^9$ | 2 | M1 for $7.7\times10^9$ or 7 695 000 000 or 7.695 exp10 or $76.95 \times 10^8$ or $2.7 \times 2.85$ with $10^{6+3}$ seen in workspace<br>A1 cao |

| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 7 | (180 – 114) ÷ 2 = 33<br><br>360 – (114 + 90 + 28 + 33) | 95 | 3 | M1 for angle $OAB = 90^o$ (these could be marked on the diagram or implied by calculation)<br><br>M1 for angle $OAC = 33^o$ or angle $OCA = 33^o$ (these could be marked on the diagram or implied by calculation)<br><br>A1 cao |
| 8 | $x = 0.28...$<br>$100x = 28.28...$<br>$99x = 28$ | Correct proof | 2 | M1 for two recurring decimals that, when subtracted, leave a correct terminating decimal<br>(e.g. $100x = 28.28...$ and $x = 0.28...$ leading to $99x = 28$)<br><br>A1 for $\frac{28}{99}$ from correct proof |
| 9 | $\frac{5(x-1)-2(x+1)}{(x+1)(x-1)}$ | $\frac{3x-7}{x^2-1}$ | 3 | M1 for denominator $(x + 1)(x - 1)$ oe<br><br>M1 for $5(x – 1)$ or $2(x + 1)$ or $5x –1$ or $2x + 1$ seen<br><br>A1 for $\frac{3x-7}{(x+1)(x-1)}$ oe |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Candidate No. | | | | | | 5 | 3 | 8 | 3 | H | / | 1 | 0 | Signature | |

Paper Reference(s)

**5383H/10**

Examiner's use only

Team Leader's use only

# Edexcel GCSE

## Mathematics (Modular) – 2381

Paper 10 (Calculator)



# Higher Tier

Unit 2 Stage 2

Tuesday 1 March 2011 – Afternoon

Time: 30 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

**Items included with question papers**
Nil

## Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
**You must NOT write on the formulae page.**
**Anything you write on the formulae page will gain NO credit.**
If you need more space to complete your answer to any question, use additional answer sheets.

## Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 9 questions in this question paper. The total mark for this paper is 25.
There are 8 pages in this question paper. Any blank pages are indicated.
**Calculators may be used.**
If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

## Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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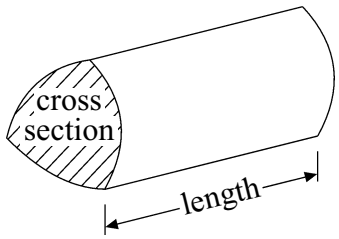
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**GCSE Mathematics 2381**

Formulae: Higher Tier

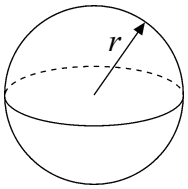
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

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



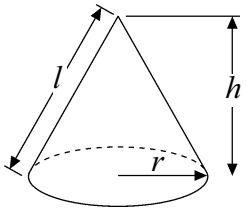

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

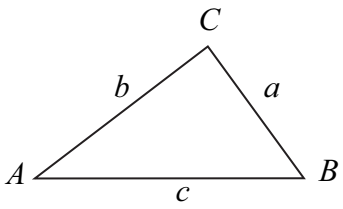



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle ABC**




**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc\cos A$

**Area of triangle** $= \frac{1}{2}ab\sin C$

**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$



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**Answer ALL NINE questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**1.**

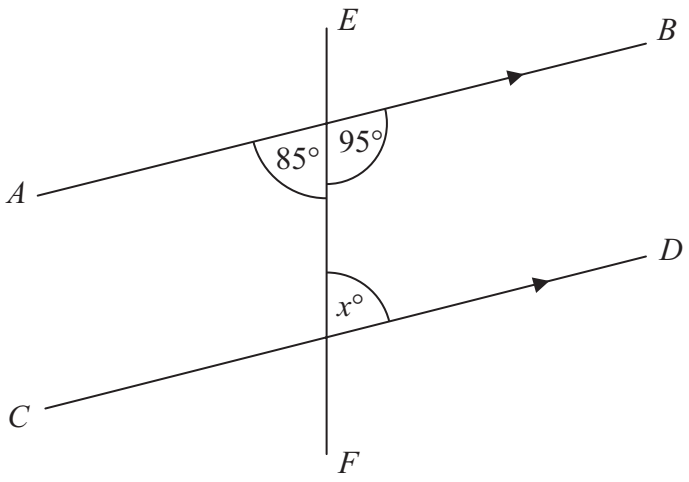



Diagram **NOT** accurately drawn

*AB* is parallel to *CD*.
*EF* is a straight line.

(i) Write down the value of *x*.

*x* = .....

(ii) Give a reason for your answer.

.....

**Q1**

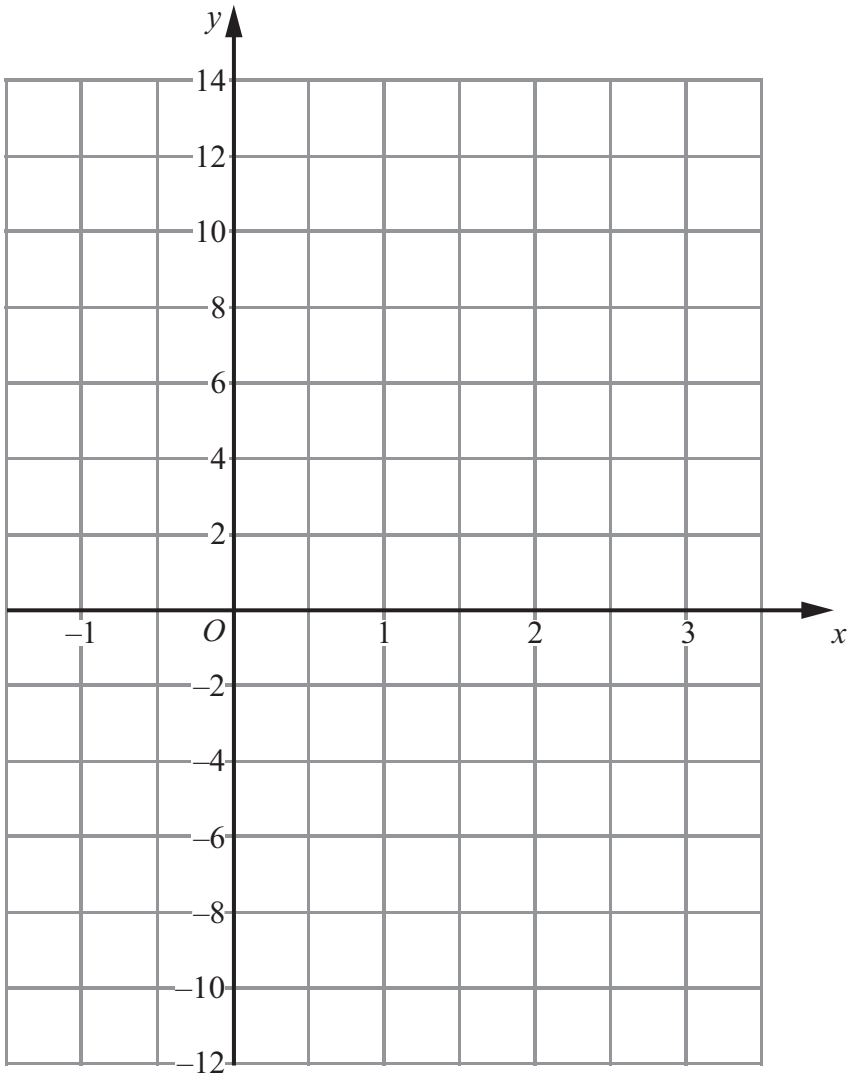
**(Total 2 marks)**



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Leave blank

**2.** On the grid, draw the graph of $y = 6x - 5$ from $x = -1$ to $x = 3$




**Q2**

**(Total 3 marks)**



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Leave blank

**3.** There are 1600 pupils in a school.
55% of the pupils are boys.

Work out the number of girls in the school.

.....

**Q3**

**(Total 2 marks)**

**4.** (a) Factorise $y^2 + 7y$

.....

**(1)**

(b) Expand and simplify $5(3x + 4) + 3(2x - 1)$

.....

**(2)**

(c) Expand and simplify $(y - 7)(y + 4)$

.....

**(2)**

**Q4**

**(Total 5 marks)**



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Leave blank

**5.** Use your calculator to work out the value of $\sqrt{\dfrac{82.3}{17.9 - 5.61}}$

Write down all the figures on your calculator display.

.....

**Q5**

**(Total 2 marks)**

**6.**

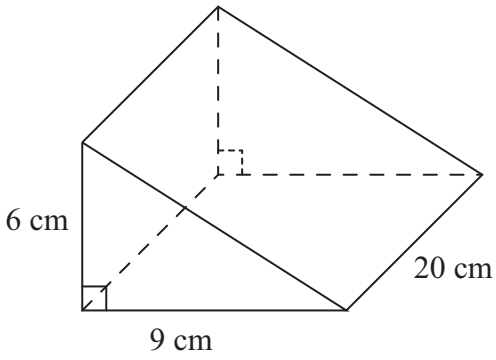



Diagram **NOT** accurately drawn

The diagram shows a solid triangular prism.

The prism is made of wood.
The prism has a mass of 243 grams.

Work out the density of the wood.

..... grams / $cm^3$

**Q6**

**(Total 3 marks)**



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**7.** Work out $(4 \times 10^{11}) \times (6 \times 10^{8})$
Give your answer in standard form.

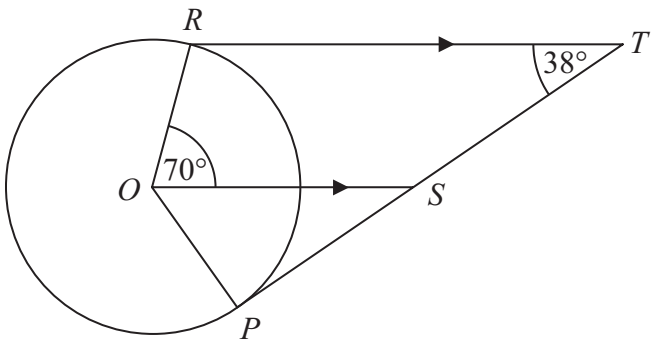
.....

**Q7**

**(Total 2 marks)**

**8.**

Diagram **NOT** accurately drawn




*TSP* is a tangent to the circle centre *O*.
*P* and *R* are points on the circle.
*RT* is parallel to *OS*.
Angle *RTS* = 38°.
Angle *ROS* = 70°.

Work out the size of angle *ORP*.

°

**Q8**

.....

**(Total 3 marks)**



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Leave blank

**9.** Simplify fully $\dfrac{3x^2+5x-2}{9x^2-1}$

.....

**Q9**

**(Total 3 marks)**

**TOTAL FOR PAPER: 25 MARKS**

**END**



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# Mark Scheme (Results)

## March 2011

GCSE

GCSE Mathematics (Modular) - 2381
Paper: 5383H/10

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B marks: unconditional accuracy marks (independent of M marks)

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indep - independent
ft – follow through
SC: special case
dep – dependent

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Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

**7 Probability**

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

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If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

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Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

**9 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

**10 Money notation**

Accepted with and without the “p” at the end.

**11 Range of answers**

Unless otherwise stated, when any answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 1 (i) | | 85 | 2 | B1 cao |
| (ii) | | Alternate angles | | B1 for alternate angles (or Z angles), dep on 85 in (i)<br>**or** co-interior angles (or allied angles), dep on 85 or 180 – 95 in (i)<br>**or** corresponding angles (or F angles) **and** angles on a straight line (=180), dep on 85 or 180 – 95 in (i)<br>**or** corresponding angles (or F angles) **and** (vertically) opposite angles, dep on 85 in (i)<br>**or** any other fully correct reason |
| 2 | Table of values<br>-1 0 1 2 3<br>-11 -5 1 7 13<br><br>**OR**<br>Use $y = mx + c$<br>with $m = 6$, $c = -5$ | Single line from (-1, -11) to (3, 13) | 3 | M2 for at least three correct points plotted<br>**or** a correct straight line which does not cover the range $x = -1$ to $x = 3$<br>(M1 for one point correctly plotted or calculated or a straight line with positive gradient through one correct point)<br>A1 cao for correct straight line between $x = -1$ and $x = 3$<br><br>**OR**<br>M1 for a straight line with positive gradient through (0, -5)<br>M1 for a straight line with gradient 6<br>A1 cao for correct straight line between $x = -1$ and $x = 3$ |



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| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 3 | $0.45 \times 1600$ | 720 | 2 | M1 for $\frac{(100-55)}{100} \times 1600$ oe **or** $1600 - \frac{55}{100} \times 1600$ oe or a correct decomposition, e.g. 800 (=50%) – 80 (=5%)<br>**or** 880 seen<br>A1 cao |
| 4 (a) | | $y(y + 7)$ | 1 | B1 cao |
| (b) | $15x + 20 + 6x - 3$ | $21x + 17$ | 2 | M1 for either $15x + 20$ or $6x - 3$<br>**or** $5 \times 3x + 5 \times 4$ or $3 \times 2x - 3 \times 1$<br>**or** $21x$ or $+17$<br>A1 cao |
| (c) | $y^2 + 4y - 7y - 28$ | $y^2 - 3y - 28$ | 2 | M1 for 3 out of no more than 4 terms correct including signs (i.e. 3 of $y^2$, $4y$, $-7y$, $-28$) **or** 4 terms correct ignoring signs (the terms may be in an expression or in a table)<br>A1 cao |
| 5 | | 2.5877(59885) | 2 | M1 for 12.29 or 6.6965… or $\frac{1229}{100}$ or $\frac{8230}{1229}$ or 2.6 or 2.58 or 2.59 or 2.587 or 2.588 or 2.5878<br>A1 for 2.5877… |



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| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 6 | $\frac{1}{2} \times 9 \times 6 \times 20 = 540$<br><br>$243 \div 540$ | 0.45 | 3 | M1 for $\frac{1}{2} \times 9 \times 6 \times 20$ **or** 540<br>M1(indep) for 243 ÷ their volume<br>A1 for 0.45 oe<br><br>SCB1 for answer of 0.225 with no working |
| 7 | | $2.4 \times 10^{20}$ | 2 | B2 for $2.4 \times 10^{20}$<br>(B1 for $a \times 10^{20}$, $a \neq 2.4$ or $2.4 \times 10^{b}$, $b \neq 20$ or $24 \times 10^{19}$) |
| 8 | $180 - 90 - 38 = 52$<br><br>$(180 - (52 + 70)) \div 2$<br><br>**OR**<br>$360 - 90 - 38 - 110 = 122$<br>$(180 - 122) \div 2$ | 29 | 3 | M1 for 180 – 90 – 38 or 52 seen (could be marked on diagram)<br>M1 for (180 – (“52” + 70)) ÷ 2<br>A1 cao<br><br>**OR**<br><br>M1 for 360 – 90 – 38 – 110 or 122 seen (could be marked on diagram)<br>M1 for (180 – “122”) ÷ 2<br>A1 cao |
| 9 | $\frac{(3x-1)(x+2)}{(3x-1)(3x+1)}$ | $\frac{x+2}{3x+1}$ | 3 | M1 for $(3x - 1)(x + 2)$<br>M1 for $(3x - 1)(3x + 1)$<br>A1 for $\frac{x+2}{3x+1}$ cao |



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| Centre No. | | | | | | Paper Reference | | | | | | | | Surname | Initial(s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Candidate No. | | | | | | 5 | 3 | 8 | 3 | H | / | 1 | 0 | Signature | |

Paper Reference(s)

**5383H/10**

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Team Leader's use only

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# Edexcel GCSE

## Mathematics (Modular) – 2381

Paper 10 (Calculator)

# Higher Tier



Unit 2 Stage 2

Monday 15 November 2010 – Afternoon

Time: 30 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator.
Tracing paper may be used.

**Items included with question papers**
Nil

### Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
**You must NOT write on the formulae page.**
**Anything you write on the formulae page will gain NO credit.**
If you need more space to complete your answer to any question, use additional answer sheets.

### Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 8 questions in this question paper. The total mark for this paper is 25.
There are 8 pages in this question paper. Any blank pages are indicated.
**Calculators may be used.**
If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

### Advice to Candidates

Show all stages in any calculations.
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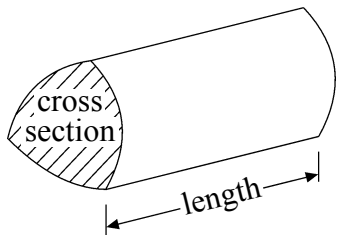
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**GCSE Mathematics 2381**

Formulae: Higher Tier

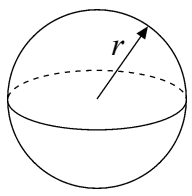
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

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



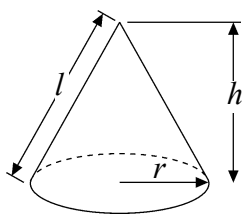

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

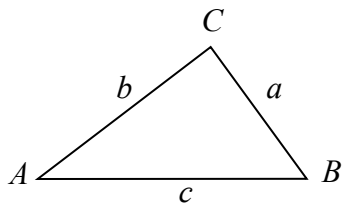



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle ABC**




**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** $= \frac{1}{2}ab \sin C$



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Leave blank

**Answer ALL EIGHT questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**1.** (a) Use your calculator to work out

$$\frac{13.23 \times 5.58}{5.21 \times 4.27}$$

Write down all the figures on your calculator display.
You must give your answer as a decimal.

.....

**(2)**

(b) Round your answer to part (a) to 1 significant figure.

.....

**(1)** **Q1**

**(Total 3 marks)**



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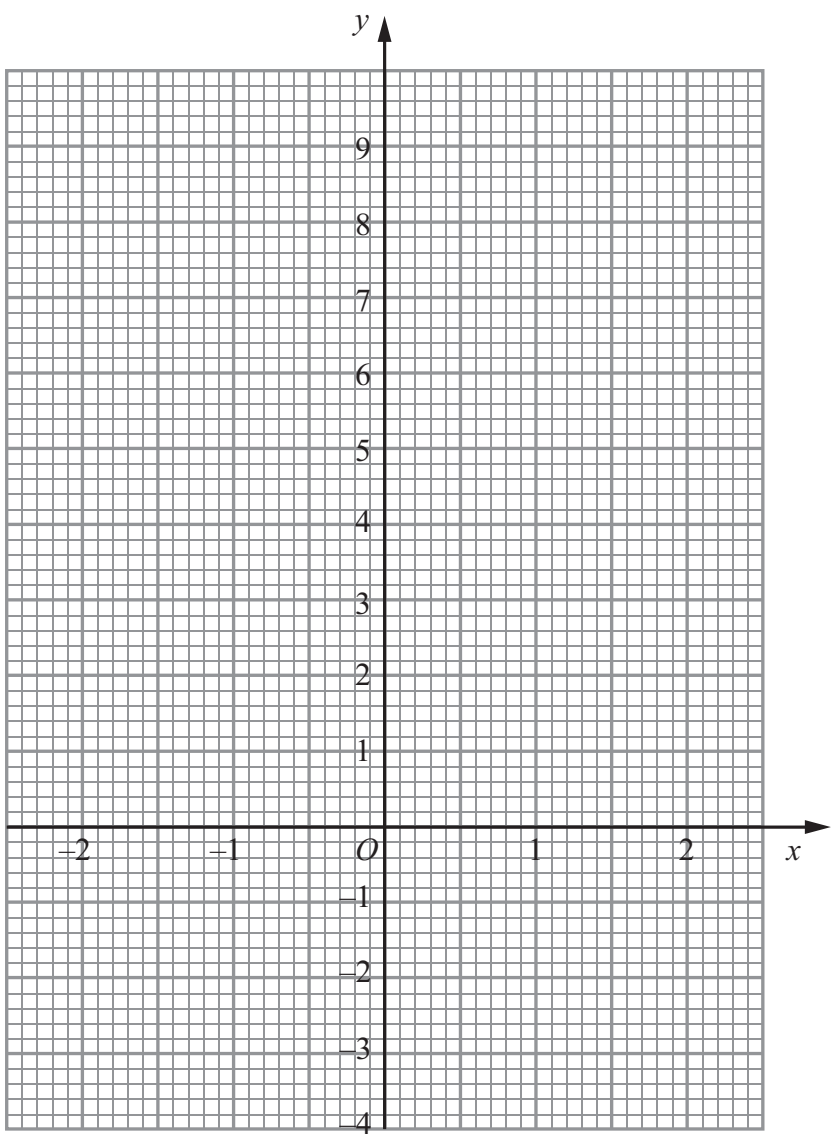
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**2.** (a) Complete the table of values for $y = 3x + 3$

| $x$ | –2 | –1 | 0 | 1 | 2 |
|---|---|---|---|---|---|
| $y$ | –3 | | | 6 | |

**(2)**

(b) On the grid, draw the graph of $y = 3x + 3$




**(2)**

**Q2**

**(Total 4 marks)**



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**3.**

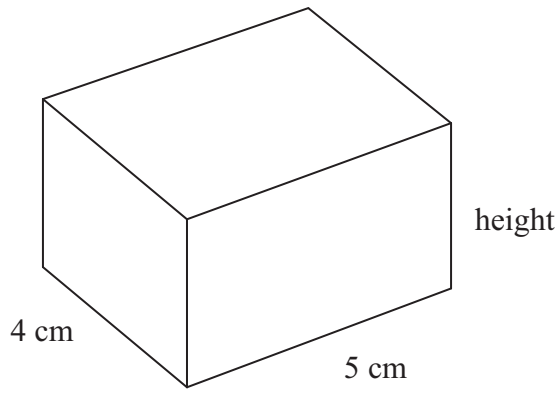



Diagram **NOT** accurately drawn

This cuboid has a width of 4 cm and a length of 5 cm.

The volume of the cuboid is 60 $cm^3$.

(a) Work out the height of the cuboid.

..... cm

**(2)**

The cuboid is a solid made from copper.

The mass of the cuboid is 534 g.

(b) Work out the density of copper.

..... $g/cm^3$

**(2)**

**Q3**

**(Total 4 marks)**



N 3 7 7 3 0 A 0 5 0 8



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**4.** (a) Expand and simplify $3(x + 1) + 2(x – 1)$

.....

**(2)**

(b) Expand and simplify $(x + 5)(x + 6)$

.....

**(2)**

**Q4**

**(Total 4 marks)**

**5.** Light travels at a speed of $3 \times 10^8$ metres per second.

How far will light travel in $8 \times 10^4$ seconds?
Give your answer in standard form.

..... metres

**(Total 2 marks)**

**Q5**



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**6.**

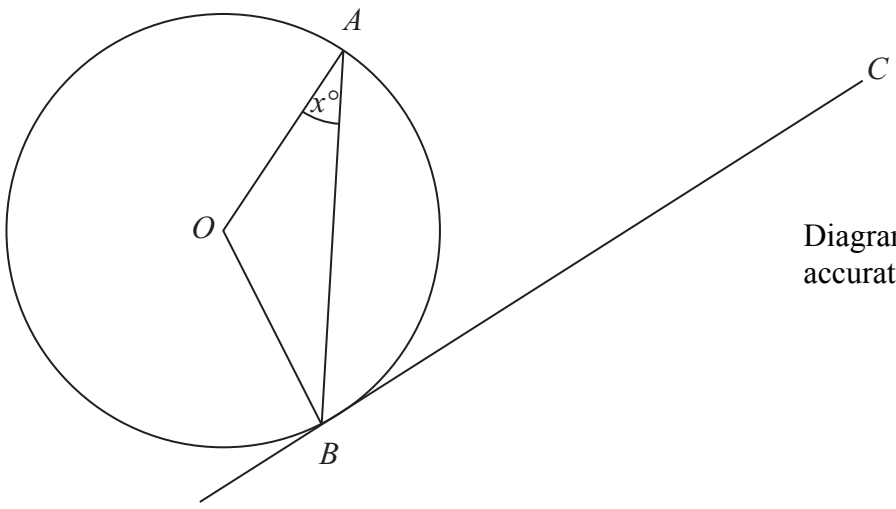



Diagram **NOT** accurately drawn

$A$ and $B$ are two points on the circumference of a circle centre $O$.
$BC$ is a tangent to the circle.
Angle $OAB = x°$.

Prove that angle $ABC = 90° - x°$.
You must give reasons for each stage in your working.

**Q6**

**(Total 3 marks)**







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**7.** Prove that the recurring decimal $0.\dot{5}\dot{7}$ can be written as the fraction $\frac{19}{33}$

**Q7**

**(Total 2 marks)**

**8.** Simplify fully $\frac{x^2+5x+6}{x^2+7x+12}$

**Q8**

.....

**(Total 3 marks)**

**TOTAL FOR PAPER: 25 MARKS**

**END**



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# Mark Scheme (Results)

## November 2010

GCSE

## GCSE Mathematics (5383H)
## Paper 10

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If you have any subject specific questions about the content of this Mark Scheme that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

Ask The Expert can be accessed online at the following link:

http://www.edexcel.com/Aboutus/contact-us/

November 2010

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## NOTES ON MARKING PRINCIPLES

**1 Types of mark**

M marks: method marks
A marks: accuracy marks
B marks: unconditional accuracy marks (independent of M marks)

**2 Abbreviations**

cao – correct answer only
isw – ignore subsequent working
oe – or equivalent (and appropriate)
indep - independent
ft – follow through
SC: special case
dep – dependent

**3 No working**

If no working is shown then correct answers normally score full marks
If no working is shown then incorrect (even though nearly correct) answers score no marks.

**4 With working**

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.



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**5 Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

**6 Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

**7 Probability**

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

**8 Linear equations**

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

**9 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

**10 Range of answers**

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)



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| 5383H/10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | (a) | $\frac{73.8234}{22.2467}$ | 3.3183(978 | 2 | B2 for 3.3183(977… or 3.3184<br>(B1 for 73.82(34) or 22.24(67)<br>(rounded or truncated))<br>or $\frac{105462}{31781}$ or $3\frac{10119}{31781}$ or 3.31, 3.32, 3.318) |
| | (b) | | 3 | 1 | B1 ft rounding to 1 s.f.<br>NB: B0 for 3.0 |
| 2 | (a) | (-3), 0, 3, (6), 9 | 0,3,9 | 2 | B2 for all three correct<br>(B1 for one or two correct) |
| | (b) | Line | Line | 2 | B2 correct line from (-2,-3) to (2,9)<br>(B1 ft (dep on at least B1 in (a)) for plotting at least 4 points OR single line of gradient 3, or single line intercept at (0,3)) |
| 3 | (a) | 60 ÷ (4 × 5) = 60 ÷ 20, or 4 × 5 × 3 | 3 | 2 | M1 for 60 ÷ (4 × 5) = 60 ÷ 20, or 4 × 5 × 3 or (60÷4)÷5 oe<br>(condone omission of brackets)<br>A1 cao |
| | (b) | 534 ÷ 60 | 8.9 | 2 | M1 for 534 ÷ 60<br>A1 cao |
| 4 | (a) | $3x + 3 + 2x - 2$ | $5x + 1$ | 2 | M1 for expansion of at least one bracket eg<br>$3\times x + 3\times 1$ or $2\times x - 2\times 1$<br>A1 cao |
| | (b) | $x^2 + 5x + 6x + 30$ | $x^2 + 11x + 30$ | 2 | M1 for 3 out of 4 terms correct including signs, or 4 terms excluding signs. For M1 accept $x\times x$, $5\times x$ etc.<br>A1 cao |



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| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| 5 | $3 \times 10^8 \times 8 \times 10^4 =$ | $2.4 \times 10^{13}$ | 2 | M1 for $3 \times 10^8 \times 8 \times 10^4$ or sight of:<br>$2.4 \times 10^n$ or $24 \times 10^{12}$ or 300000000 × 80000<br>or 24 000 000 000 000<br>A1 $2.4 \times 10^{13}$ |
| 6 | | 90-*x* with proof | 3 | M1 Identification of *OBC* as 90° (can be on the diagram)<br>M1 *OBA* = *x or OBA* = *OAB* (can be on the diagram)<br>A1 Final step of using both Ms & reasons (including isosceles and angle between tangent & radius or tangent & diameter ) to state *ABC* as 90-*x* |



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| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| 7 | $x = 0.575757\ldots$<br>$100x = 57.5757\ldots$<br>$99x = 57$<br>$x = \frac{57}{99} = \frac{19}{33}$<br>or<br>$10000x - 1x = 5757$<br>$9999x = 5757$<br>$x = \frac{5757}{9999} = \frac{19}{33}$<br>or<br>$10000x - 100x = 5750$<br>$x = \frac{5750}{9900} = \frac{19}{33}$<br>$33\overline{)19.^{19}0^{25}0^{19}0^{25}00}$ $0.\ 5\ \ 7\ \ 5\ 7\ldots$ | $\frac{19}{33}$ | 2 | M1 for a valid method involving two correct recurring decimals that, when subtracted, would result in a terminating decimal, and attempting the subtraction<br>e.g. $100x = 57.57..$ or $57.\dot{5}\dot{7}$, $x = 0.5757..$ or $0.\dot{5}\dot{7}$ **and** subtracting<br>A1 for $\frac{19}{33}$ from correct proof including correct notation for the recurring decimals<br>Or<br>M1 starts long/short division of 33 into 19, set out correctly, with 0.57 seen on the top of the bus stop (oe) with a remainder of 19 shown<br>A1 At least 2 remainders of 19 and one of 25 seen in the correct place and with a statement that the decimal will recur with a cycle length 2 because the remainders have a cycle length 2.(oe) |
| 8 | $\frac{(x+2)(x+3)}{(x+3)(x+4)} = \frac{x+2}{x+4}$ | $\frac{x+2}{x+4}$ | 3 | B1 for $(x+2)(x+3)$<br>B1 for $(x+3)(x+4)$<br>B1 for $\frac{x+2}{x+4}$ (accept in brackets) |



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# Edexcel GCSE

## Mathematics (Modular) – 2381

Paper 10 (Calculator)

# Higher Tier



Unit 2 Stage 2

Monday 21 June 2010 – Afternoon

Time: 30 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator.
Tracing paper may be used.

**Items included with question papers**
Nil

### Instructions to Candidates

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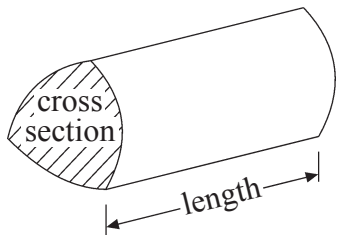
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**GCSE Mathematics**

Formulae: Higher Tier

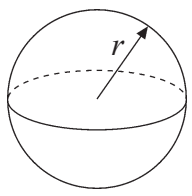
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**Anything you write on this formulae page will gain NO credit.**

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



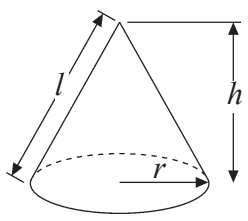

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

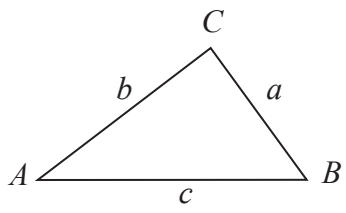



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle ABC**




**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** $= \frac{1}{2}ab \sin C$



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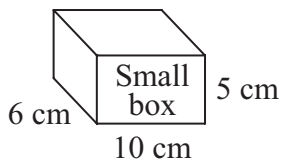
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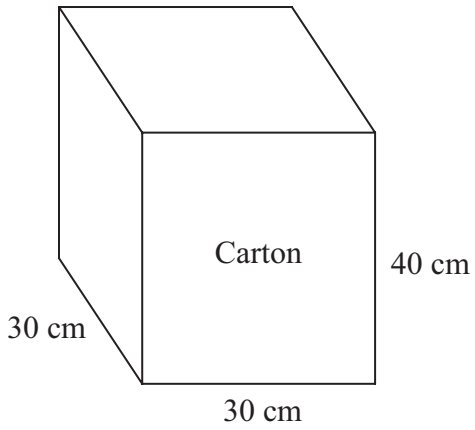
**Answer ALL TEN questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**1.**




Diagrams **NOT** accurately drawn

A small box measures 6 cm by 10 cm by 5 cm.
A carton measures 30 cm by 30 cm by 40 cm.

The carton is completely filled with small boxes.

Work out the number of small boxes in the carton.

.....

**(Total 3 marks)**

**Q1**







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Leave blank

**2.** (a) Simplify $3a + 2b + a - 5b$

.....

**(2)**

(b) Expand $4(x - 2)$

.....

**(1)**

**Q2**

**(Total 3 marks)**

**3.** Work out the value of $\dfrac{6.5^2}{7.3 - 2.54}$

Write down all the figures on your calculator display.
You must give your answer as a decimal.

.....

**Q3**

**(Total 2 marks)**

**4.** Write as a power of 7

(i) $7^6 \times 7^2$

.....

(ii) $7^9 \div 7^5$

.....

**Q4**

**(Total 2 marks)**



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**5.** The density of iron is 7850 kg/m$^3$.

Work out the mass of 4 m$^3$ of iron.

..... kg

**Q5**

**(Total 2 marks)**

**6.** The population of Italy is $6 \times 10^7$
The population of San Marino is $3 \times 10^4$

The population of Italy is bigger than the population of San Marino.
How many times bigger?

.....

**Q6**

**(Total 2 marks)**



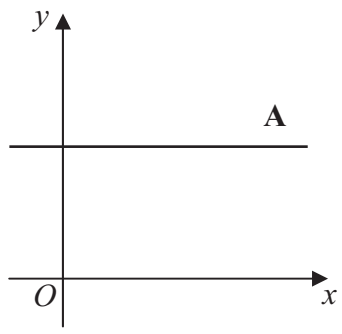


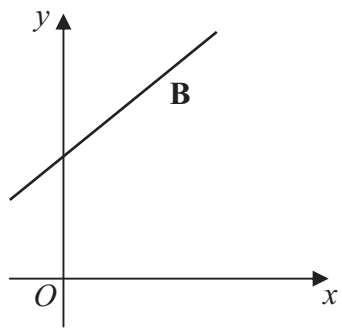


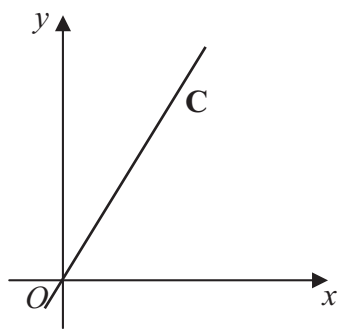
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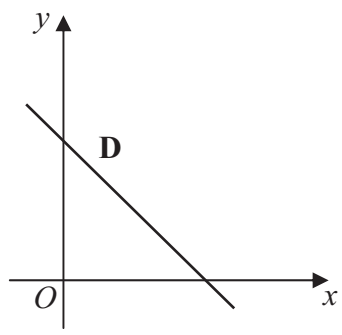
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**7.** Here are the graphs of four straight lines labelled **A**, **B**, **C** and **D**.




The equations of the straight lines are

$y = 3x$ $\quad$ $y = x + 3$ $\quad$ $y = 3$ $\quad$ $y = 3 - x$

Match each straight line, **A**, **B**, **C** and **D**, to its equation.
Complete the table.

| Equation | Straight line |
|---|---|
| $y = 3x$ | |
| $y = x + 3$ | |
| $y = 3$ | |
| $y = 3 - x$ | |

**Q7**

**(Total 2 marks)**



N 3 6 7 3 5 A 0 6 0 8

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**8.**

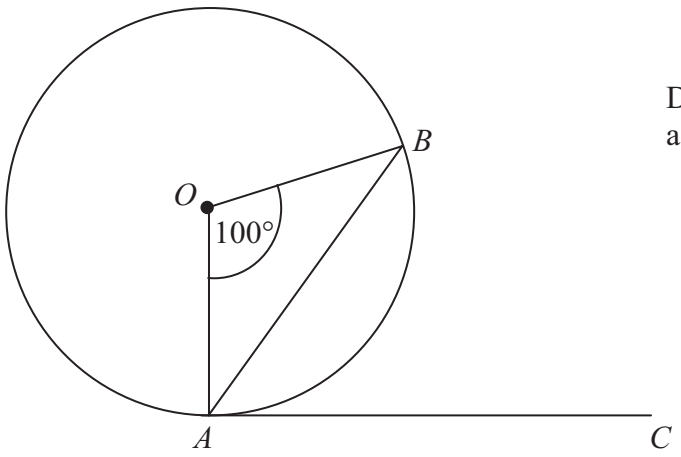



Diagram **NOT** accurately drawn

$A$ and $B$ are points on the circumference of a circle, centre $O$.
$AC$ is a tangent to the circle.

Angle $AOB = 100°$

Find the size of angle $BAC$.
Give reasons for each stage of your working.

.....°

**(Total 3 marks)**

**Q8**



N 3 6 7 3 5 A 0 7 0 8

**Turn over**

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Leave blank

**9.** Simplify fully $\dfrac{3x^2 + x - 4}{2x^2 - 2x}$

.....

**Q9**

**(Total 3 marks)**

**10.** Use algebra to prove that the sum of three consecutive whole numbers is always divisible by 3

**Q10**

**(Total 3 marks)**

**TOTAL FOR PAPER: 25 MARKS**

**END**



N 3 6 7 3 5 A 0 8 0 8

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# Mark Scheme (Results)

## Summer 2010

GCSE

GCSE Mathematics (Modular) - 2381
Paper: 5381H/10

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Summer 2010

Publications Code UG024451

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| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | $(40\div5)\times(30\div10)\times(30\div6)$ | 120 | 3 | M1 for $40\div5$ **or** $30\div10$ **or** $30\div6$ **or** $40\div10$ **or** $30\div5$ or at least two of 8, 3, 5 seen.<br>M1 (dep) for $(40\div5)\times(30\div10)\times(30\div6)$ **or** $(40\div10)\times(30\div6)\times(30\div5)$ **or** "8"×"5"×"3" **or** "4"×"5"×"6"<br>A1 cao<br><br>**OR**<br><br>M1 for $6\times10\times5$ **or** 300 **or** $30\times30\times40$ **or** 36000<br>M1 (dep) for $(30\times30\times40)\div(6\times10\times5)$ or "36000" ÷ "300"<br>A1 cao |
| 2 (a) | | $4a-3b$ | 2 | B2 cao<br>(B1 for $4a$ or $-3b$ seen) |
| (b) | | $4x-8$ | 1 | B1 cao |
| 3 | | 8.87605 (042.) | 2 | M1 for 42.25 seen **or** 4.76 seen<br>A1 for 8.87605 (042…)<br>SC: B1 for $\frac{4225}{476}$ **or** $8\frac{417}{476}$ **or** answer in range 8.8-8.9 inclusive |

| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 4 (i) | | $7^8$ | 2 | B1 for $7^8$, accept $7^{6+2}$ |
| (ii) | | $7^4$ | | B1 for $7^4$, accept $7^{9-5}$ |
| 5 | $7850 \times 4$ | 31400 | 2 | M1 for $7850 \times 4$<br>A1 cao |
| 6 | $(6\times10^7)\div(3\times10^4)$ | $2\times10^3$ | 2 | M1 for $(6\times10^7)\div(3\times10^4)$ **or** "60000000"÷"30000"<br>A1 for $2\times10^3$ or 2000 |
| 7 | | C, B, A, D | 2 | B2 all correct<br>(B1 for 2 or 3 correct) |
| 8 | $(180-100)\div 2 = 40$<br>$90-40=50$ | 50 | 3 | M1 for identifying angle *OAC* as $90^o$ **or** angle *BAO* or angle *ABO* as $40^o$, could be marked on the diagram **or** $(180\text{-}100)\div 2$<br>A1 cao<br>B1 for (base angles of an) isosceles triangle (are equal) **and** angles in a triangle add up to $180^o$ **and** angle between tangent and radius is $90^o$ |

| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 9 | $\frac{3x^2+x-4}{2x^2-2x} = \frac{(3x+4)(x-1)}{2x(x-1)}$ | $\frac{3x+4}{2x}$ | 3 | M1 for $(3x+4)(x-1)$<br>M1 for $2x(x-1)$<br>A1 cao |
| 10 | $n+n+1+n+2=3n+3$ | Proof | 3 | M1 for three consecutive numbers expressed algebraically, eg. $n, n+1, n+2$ oe<br>M1(dep) for "n"+"n+1"+"n+2"<br><br>A1 for "3n + 3" **and** correct reasoning, e.g. '$3n+3$ is divisible by 3 as $3n+3=3(n+1)$' or '$3n+3$ is divisible by 3 as both $3n$ and 3 are divisible by 3' or '3 is a factor of $3n+3$' or '$3n+3=3(n+1)$' or '$(3n+3) \div 3 = n+1$' |

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| Centre No. | | | | | | Paper Reference | | | | | | | | Surname | Initial(s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Candidate No. | | | | | | 5 | 3 | 8 | 3 | H | / | 1 | 0 | Signature | |

Paper Reference(s)

**5383H/10**

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Team Leader's use only

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| | | |

# Edexcel GCSE

## Mathematics (Modular) – 2381

Paper 10 (Calculator)

# Higher Tier



Unit 2 Stage 2

Tuesday 2 March 2010 – Afternoon

Time: 30 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator.
Tracing paper may be used.

**Items included with question papers**
Nil

### Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
**You must NOT write on the formulae page.**
**Anything you write on the formulae page will gain NO credit.**
If you need more space to complete your answer to any question, use additional answer sheets.

### Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 9 questions in this question paper. The total mark for this paper is 25.
There are 8 pages in this question paper. Any blank pages are indicated.
**Calculators may be used.**
If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

### Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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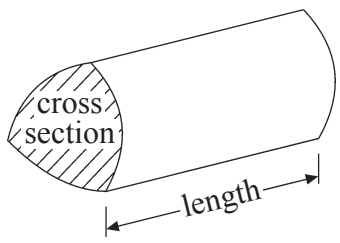
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**GCSE Mathematics 2381**

Formulae: Higher Tier

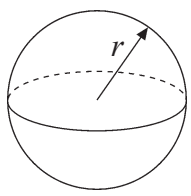
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

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



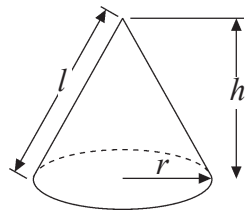

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

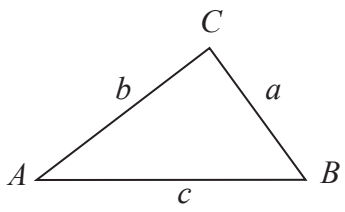



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle ABC**




**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** $= \frac{1}{2}ab \sin C$



N 3 6 2 8 7 A 0 2 0 8

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Leave blank

**Answer ALL NINE questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**1.** The weight of a chocolate bar is 120 grams.
15% of the weight is protein.

Work out the weight of the protein in the chocolate bar.

..... g

**(Total 2 marks)**

**Q1**

**2.**

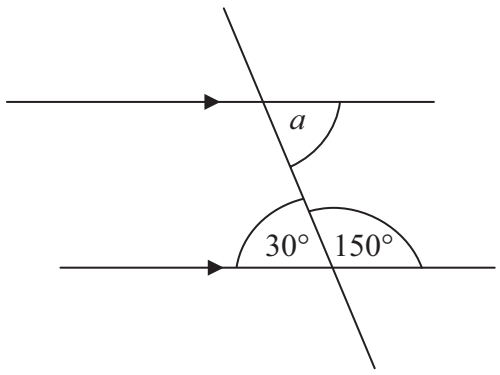



Diagram **NOT** accurately drawn

(i) Write down the size of angle *a*.

..... °

(ii) Give a reason for your answer.

.....

.....

.....

**(Total 2 marks)**

**Q2**



N 3 6 2 8 7 A 0 3 0 8



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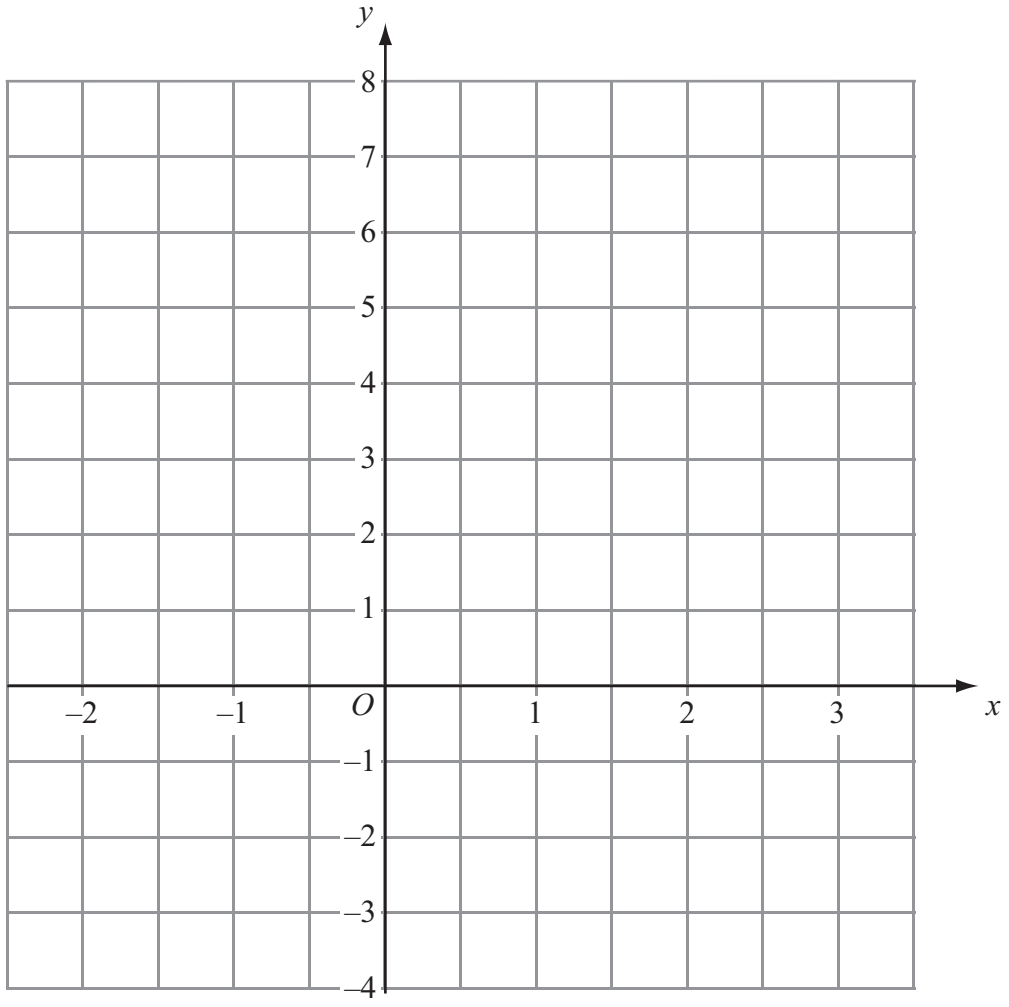
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**3.** (a) Complete the table of values for $y = 2x + 1$

| $x$ | – 2 | – 1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| $y$ | | – 1 | | | 5 | |

**(2)**

(b) On the grid, draw the graph of $y = 2x + 1$




**(2)**

**Q3**

**(Total 4 marks)**



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**4.**

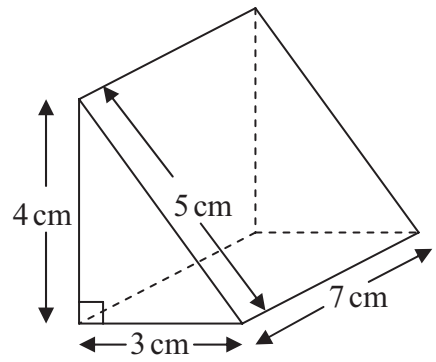



Diagram **NOT** accurately drawn

Work out the volume of the triangular prism.

..... $cm^3$

**(Total 2 marks)**

**Q4**

**5.** (a) Expand $x(x - 5)$

.....

**(1)**

(b) Factorise $4y + 6$

.....

**(1)**

(c) Factorise $x^2 - 36$

.....

**(1)**

**Q5**

**(Total 3 marks)**



N 3 6 2 8 7 A 0 5 0 8

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**6.** (a) Write $2.7 \times 10^5$ as an ordinary number.

.....

**(1)**

(b) Work out the value of $(4 \times 10^9) \times (3 \times 10^{-2})$

Give your answer in standard form.

.....

**(2)** **Q6**

**(Total 3 marks)**

**7.**

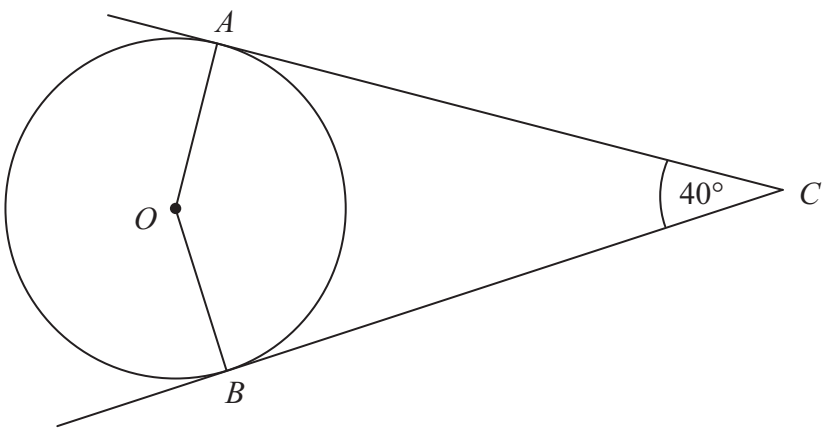



Diagram **NOT** accurately drawn

*A* and *B* are points on the circumference of a circle, centre *O*.
*AC* and *BC* are tangents to the circle.

Angle *ACB* = 40°.

Find the size of angle *ABO*.

..... °

**Q7**

**(Total 3 marks)**



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**8.** Simplify fully $\dfrac{3x^2 + 6x}{2x^2 + x - 6}$

.....

**Q8**

**(Total 3 marks)**

**9.** Prove that the recurring decimal $0.4\dot{2}\dot{7}$ can be written as the fraction $\dfrac{47}{110}$

**Q9**

**(Total 3 marks)**

**TOTAL FOR PAPER: 25 MARKS**

**END**



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# Mark Scheme (Results)

## March 2010

GCSE

GCSE Mathematics (Modular) - 2381
Paper: 5383H/10

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March 2010

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| 5383H/10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | | $\frac{15}{100} \times 120$ | 18 | 2 | M1 for $\frac{15}{100} \times 120$ oe<br><br>or for 10% = 12 and 5% = 6 with intention to add<br><br>A1 cao |
| 2 | (i) | | 30 | 2 | B1 for 30 cao |
| | (ii) | | alternate angles | | B1 for alternate angles (or Z angles), dep on 30 in (i)<br>**or** co-interior angles, dep on 30 or 180 – 150 in (i)<br>**or** allied angles, dep on 30 or 180 – 150 in (i)<br>**or** corresponding angles (or F angles) **and** angles on a straight line (= 180), dep on 30 or 180 – 150 in (i)<br>**or** corresponding angles (or F angles) **and** (vertically) opposite angles, dep on 30 in (i)<br>**or** any other fully correct reason |
| 3 | (a) | | – 3, (– 1), 1, 3, (5), 7 | 2 | B2 for all 4 values<br>(B1 for any 2 correct) |
| | (b) | | Correct line | 2 | B2 cao for correct line between $x = -2$ and $x = 3$<br>(B1 ft for plotting 4 points correctly or for a straight line with gradient 2 or for straight a line passing through (0, 1)) |



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| 5383H/10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 4 | | $\frac{1}{2} \times 3 \times 4 \times 7$ | 42 | 2 | M1 for $\frac{1}{2} \times 3 \times 4 \times 7$ or for 7 as part of a triple product<br>A1 cao |
| 5 | (a) | | $x^2 - 5x$ | 1 | B1 cao |
| | (b) | | $2(2y + 3)$ | 1 | B1 cao |
| | (c) | | $(x + 6)(x - 6)$ | 1 | B1 cao |
| 6 | (a) | | 270000 | 1 | B1 cao |
| | (b) | | $1.2 \times 10^8$ | 2 | M1 for $12 \times 10^7$ or $12 \times 10^{9-2}$ or $1.2 \times 10^n$, where $n$ is a positive integer, or for $4\,000\,000\,000 \times 0.03$ or for 120 000 000 oe seen<br>A1 cao |



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| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 7 | $90 - \frac{180 - 40}{2}$ | 20 | 3 | M2 for a complete correct method<br>e.g. $90 - \frac{180 - 40}{2}$<br>or $\frac{1}{2}(180 - (360 - 90 - 90 - 40))$<br>(M1 for angle *OAC* or angle *OBC* = $90^o$ or 90 seen<br>or angle *AOB* = $140^o$ or 180 – 40 or 140 seen<br>or angle *CAB* or angle *CBA* = $70^o$ or 70 seen<br>(these could be marked on the diagram or implied by calculation))<br>A1 cao |
| 8 | $\frac{3x(x+2)}{(x+2)(2x-3)}$ | $\frac{3x}{2x-3}$ | 3 | M1 for $3x(x + 2)$<br>M1 for $(x + 2)(2x - 3)$<br>A1 cao |

| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 9 | $10x = 4.272727....$<br>$1000x = 427.272727....$<br><br>$990x = 423$<br><br>$x = \frac{423}{990}$<br><br>$\frac{423}{990} = \frac{47}{100}$<br><br>OR<br><br>$100x = 42.727272...$<br>$10x = 4.272727...$<br><br>$110x = 46.9999...$<br><br>$46.9999... = 46+0.9999...$<br>Let $y = 0.9999...$<br>$10y = 9.9999...$<br>$9y = 9$<br>$y = 1$<br><br>so $46.9999... = 47$<br><br>$110x = 47$<br><br>$x = \frac{47}{110}$ | Correct proof | 3 | M1 for a valid method involving two correct recurring decimals that, when subtracted, would result in a terminating decimal, **and** subtracting<br>e.g. $100x = 42.7272...$, $x = 0.42727....$ and subtracting<br><br>A1 for $99x = 42.3$ or $990x = 423$ or $110x = 47$ or $\frac{42.3}{99}$ or $\frac{423}{990}$<br><br>A1 for completion of proof, including "$\frac{423}{990}$" = $\frac{47}{110}$<br><br>OR<br><br>M1 for a valid method involving two correct recurring decimals that, when added, would result in a recurring decimal with 9s recurring, **and** adding<br><br>e.g. $100x = 42.7272...$, $10x = 4.2727...$ and adding<br>or $1000x = 427.2727...$, $100x = 42.7272....$ and adding<br><br>A1 for $110x = 46.9999...$ or $1100x = 469.9999...$<br><br>A1 for completion of proof. This must include proof that $46.9999... = 47$ or $469.9999... = 470$ (it is not sufficient to merely state that $46.9999... = 47$ or that $469.9999... = 470$) |



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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Candidate No. | | | | | | 5 | 3 | 8 | 3 | H | / | 1 | 0 | Signature | |

Paper Reference(s)

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# Edexcel GCSE

## Mathematics (Modular) – 2381

Paper 10 (Calculator)

# Higher Tier



Unit 2 Stage 2

Friday 13 November 2009 – Afternoon

Time: 30 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

**Items included with question papers**
Nil

## Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
**You must NOT write on the formulae page.**
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There are 8 pages in this question paper. Any blank pages are indicated.
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If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

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Work steadily through the paper. Do not spend too long on one question.
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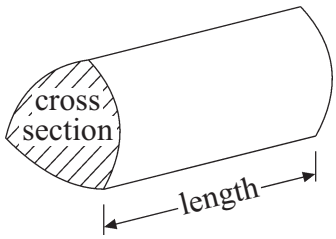
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**GCSE Mathematics 2381**

Formulae: Higher Tier

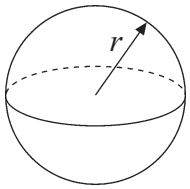
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

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



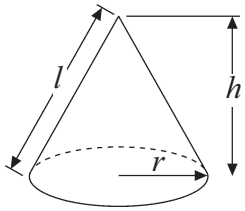

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

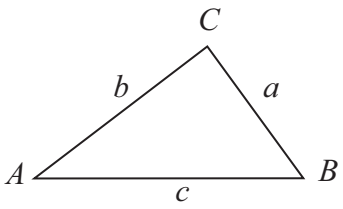



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle ABC**




**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc\cos A$

**Area of triangle** $= \frac{1}{2}ab\sin C$

**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$



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N 3 4 9 8 6 A 0 2 0 8

Leave blank

**Answer ALL NINE questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**1.** Donna ran 400 metres in 50 seconds.

Work out Donna's average speed in metres per second.

..... metres per second

**(Total 2 marks)**

**Q1**

**2.** *ACD* is a triangle.

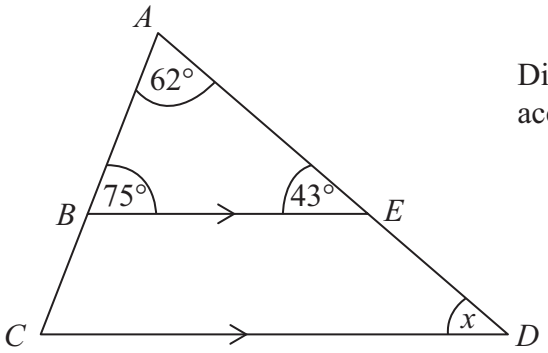



Diagram **NOT** accurately drawn

*BE* is parallel to *CD*.

(a) Find the value of the angle marked *x*.

.....°

**(1)**

(b) Give a reason for your answer.

.....

.....

**(1)**

**(Total 2 marks)**

**Q2**



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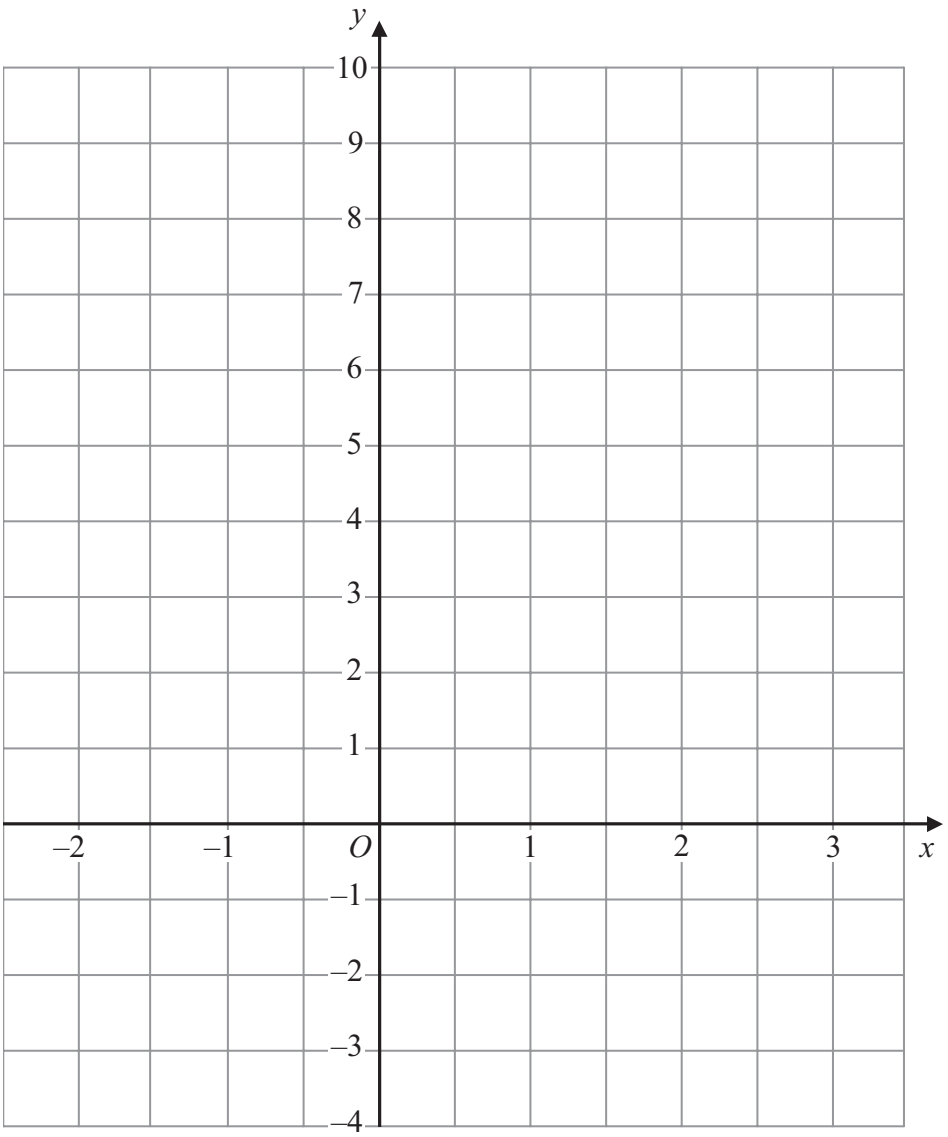
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**3.** (a) Complete this table of values for $y = 2x + 3$

| $x$ | –2 | –1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| $y$ | | 1 | | 5 | | |

**(2)**

(b) On the grid, draw the graph of $y = 2x + 3$




**(2)** **Q3**

**(Total 4 marks)**



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**4.** (a) Expand and simplify $(x + 3)(x + 1)$

.....

**(2)**

(b) Factorise $y^2 + 2y - 15$

.....

**(2)** **Q4**

**(Total 4 marks)**

**5.** (a) Simplify $3^4 \times 3^2$
Write your answer as a power of 3

.....

**(1)**

(b) Simplify $5^5 \div 5^2$
Write your answer as a power of 5

.....

**(1)** **Q5**

**(Total 2 marks)**

**6.** The distance of the Sun from the Earth is $9.3 \times 10^7$ miles.
The distance of the Moon from the Earth is 250 000 miles.

The Sun is further from the Earth than the Moon is from the Earth.
How many times further?
Give your answer in standard form.

**Q6**

.....

**(Total 3 marks)**



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Leave blank

**7.** Write $\frac{2x}{2x-3} - \frac{7}{x(2x-3)}$ as a single fraction in its simplest form.

.....

**Q7**

**(Total 2 marks)**

**8.** Prove that the recurring decimal $0.\dot{2}\dot{5} = \frac{25}{99}$

**Q8**

**(Total 2 marks)**



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**9.**

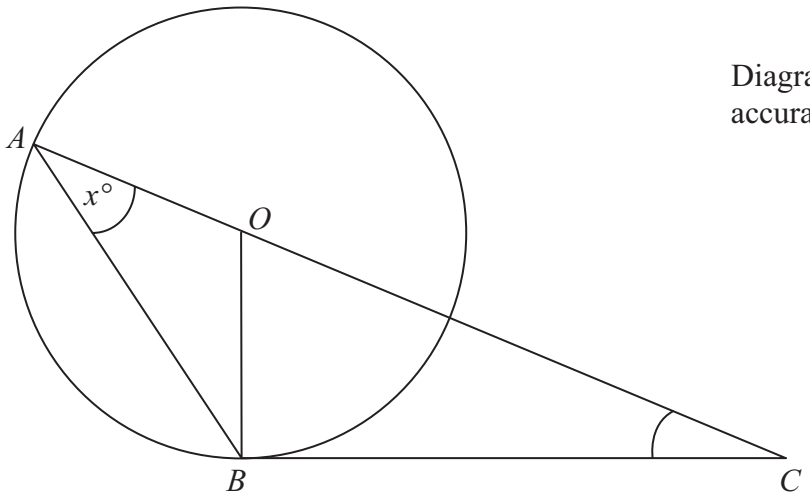



Diagram **NOT** accurately drawn

*A* and *B* are points on a circle, centre *O*.
*BC* is a tangent to the circle.
*AOC* is a straight line.

(a) (i) What is the size of angle *OBC*?

.....°

(ii) Give a reason for your answer.

.....

**(2)**

Angle *BAO* = *x*°.

(b) Find the size of angle *ACB*, in terms of *x*.

.....°

**(2)** **Q9**

**(Total 4 marks)**

**TOTAL FOR PAPER: 25 MARKS**

**END**



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# Mark Scheme (Results)

## November 2009

GCSE

GCSE Mathematics (Modular) - 2381
Paper: 5383H/10

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November 2009

Publications Code UG 022443

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5383H_10
0911

| 5383H/10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | | | 8 | 2 | M1 for 400 ÷ 50<br>A1 for 8 |
| 2 | (a) | | 43° | 1 | B1 cao |
| | (b) | | | 1 | B1 for corresponding angles **or** F angles **or** correct full reasons if other method used |
| 3 | (a) | –1, (1), 3, (5), 7, 9 | –1, (1), 3, (5), 7, 9 | 2 | B2 for 4 values correct<br>(B1 for 2 or 3 values correct) |
| | (b) | | Line drawn | 2 | M1 for plotting at least 5 of their points correctly<br>**or** single straight line with positive gradient passing thro' (0,3) from x=-2 to x=3<br>**or** single straight line of gradient 2 from $x$=-2 to $x$=3<br>**or** correct straight line that passes through 3 correct points<br>A1 cao for straight line from at least (-2,-1) to (3,9) |
| 4 | (a) | $x^2 + 3x + x + 3$ | $x^2 + 4x + 3$ | 2 | M1 for 4 terms correct with or without signs or 3 correct **in each case there must be a maximum of 4 terms**<br>(the terms may be in an expression or table)<br>**or** $x(x + 3) + 1(x + 3)$ **or** $x(x + 1) + 3(x + 1)$<br>A1 cao |
| | (b) | | $(y + 5)(y - 3)$ | 2 | M1 for $(y \pm 5)(y \pm 3)$<br>A1 cao<br>NB : Use isw if candidate goes onto solve equation |
| 5 | (a) | | $3^6$ | 1 | B1 accept $3^{4+2}$ |
| | (b) | | $5^3$ | 1 | B1 accept $5^{5-2}$ |



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| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 6 | 93 000 000 ÷ 250 000<br>372 | $3.72\times10^2$ | 3 | M1 for $9.3\times10^7 \div 250\,000$ oe (condone any error converting into or out of standard form)<br>A2 for $3.72\times10^2$<br>(A1 for 372)<br>SC : If no marks awarded then award B1 for digits 372 or 93 000 000 seen or $2.5\times10^5$ seen |
| 7 | $\frac{2x\times x-7}{x(2x-3)}$ | $\frac{2x^2-7}{x(2x-3)}$ | 2 | M1 for a correct common denominator eg $x(2x-3)$oe or $x(2x-3)^2$ oe<br>A1 for $\frac{2x^2-7}{x(2x-3)}$ or $\frac{2x^2-7}{2x^2-3x}$ as final answer |
| 8 | $100x = 25.252525\ldots$<br>$x = 0.252525\ldots$<br>$99x = 25 \quad x = \frac{25}{99}$ | $\frac{25}{99}$ | 2 | M1 for valid method<br>eg $100x = 25.2525\ldots$, $x = 0.2525\ldots$ and clear intent to subtract<br>**OR**<br>$1000x = 252.525\ldots$, $10x = 2.525\ldots$ and clear intent to subtract<br>A1 for valid argument leading to $\frac{25}{99}$<br>**Alternative method** for long division<br>M1 for identifying 52 and 25 as remainders<br>A1 for correct statement |
| 9 (a)(i) | | 90 | 1 | B1 cao for 90 |
| (ii) | | | 1 | B1 for angle between tangent and radius is 90º |
| (b) | Angle $ABO = x$<br>Angle $ABC = 90 + x$<br>$y = 180 - (x + 90 + x)$ | $90 - 2x$ | 2 | M1 for identifying angle ABO as $x$ **or** angle BOC as $2x$ these could be seen on the diagram or in working<br>A1 for $90 - 2x$ oe for example, $180 - (90 + 2x)$ |



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| Centre No. | | | | | | Paper Reference | | | | | | | | Surname | Initial(s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Candidate No. | | | | | | 5 | 3 | 8 | 3 | H | / | 1 | 0 | Signature | |

Paper Reference(s)

**5383H/10**

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| | | |

# Edexcel GCSE

## Mathematics (Modular) – 2381

Paper 10 (Calculator)

# Higher Tier



Unit 2 Stage 2

Thursday 11 June 2009 – Afternoon

Time: 30 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator.
Tracing paper may be used.

**Items included with question papers**
Nil

### Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
**You must NOT write on the formulae page.**
**Anything you write on the formulae page will gain NO credit.**
If you need more space to complete your answer to any question, use additional answer sheets.

### Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 10 questions in this question paper. The total mark for this paper is 25.
There are 8 pages in this question paper. Any blank pages are indicated.
**Calculators may be used.**
If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

### Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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*Turn over*

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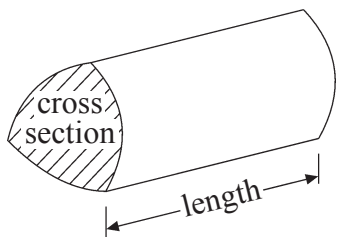
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**GCSE Mathematics**

Formulae: Higher Tier

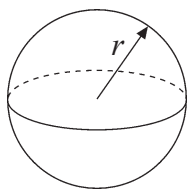
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

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



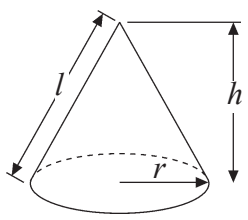

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

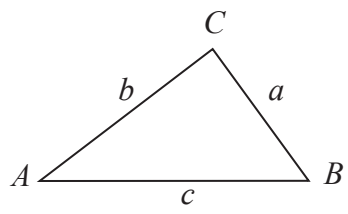



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle ABC**




**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** $= \frac{1}{2}ab \sin C$



N 3 4 0 7 4 A 0 2 0 8

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Leave blank

**Answer ALL TEN questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**1.** Work out $\dfrac{3.4^2 - 2.6^2}{1.6}$

.....

**(Total 2 marks)**

Q1

**2.**

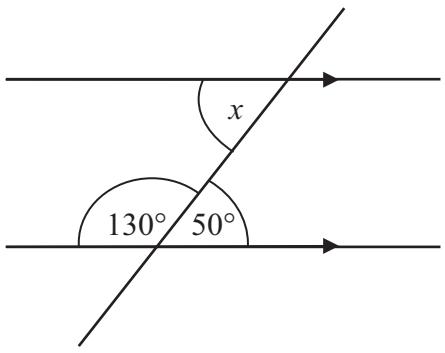



Diagram **NOT** accurately drawn

(a) Write down the size of the angle marked $x$.

.....°

**(1)**

(b) Give a reason for your answer.

.....

**(1)**

**(Total 2 marks)**

Q2



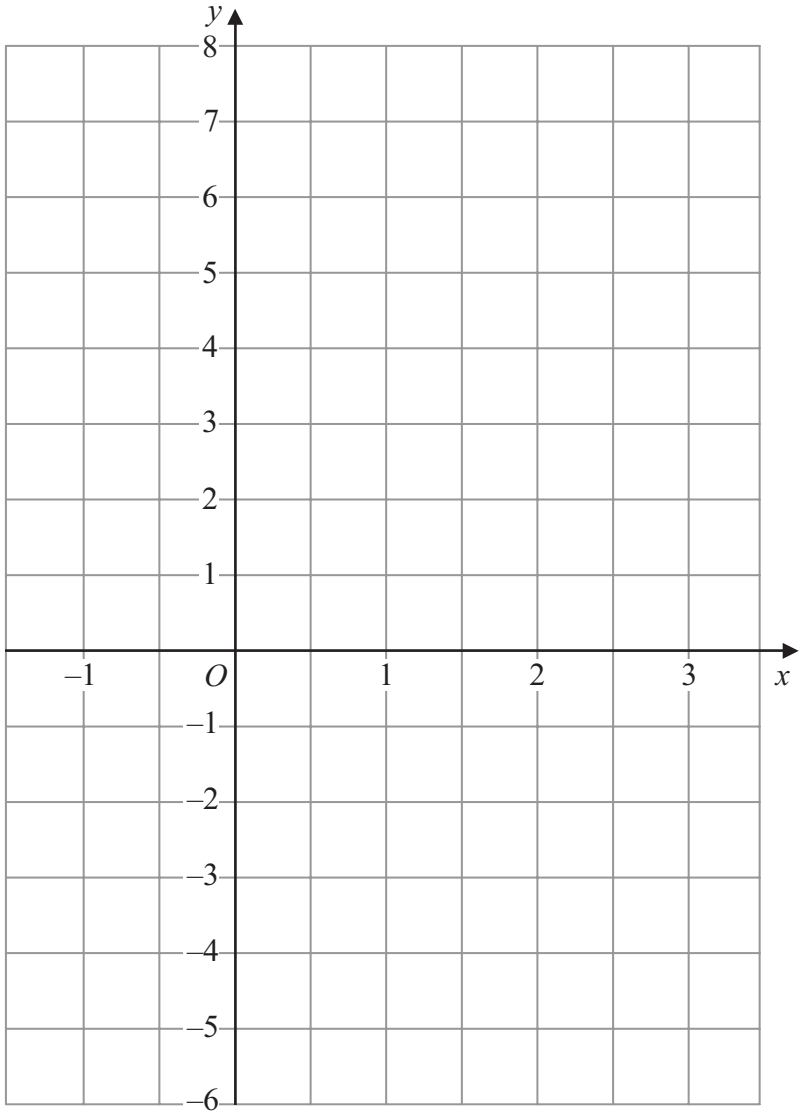
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**3.** Draw the graph of $y = 3x - 2$ for values of $x$ from $-1$ to 3




Q3

**(Total 3 marks)**



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**4.** The diagram shows a prism.

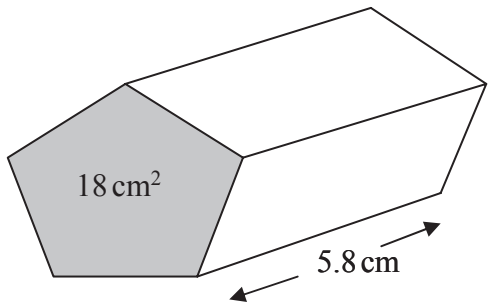



Diagram **NOT** accurately drawn

The area of the cross section of the prism is 18 cm$^2$.
The length of the prism is 5.8 cm.

Work out the volume of the prism.

..... cm$^3$

**Q4**

**(Total 2 marks)**

**5.** (a) Expand and simplify $3(2x + 3) + 2(x + 1)$

.....

**(2)**

(b) Expand and simplify $(y - 3)(y + 4)$

.....

**(2)**

**Q5**

**(Total 4 marks)**



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**6.**

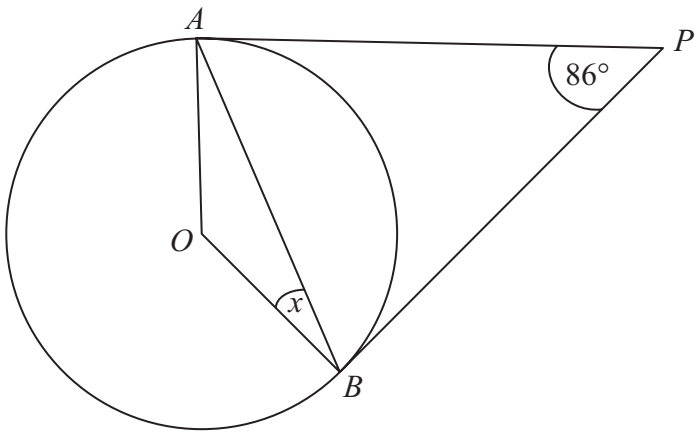



Diagram **NOT** accurately drawn

*A* and *B* are points on the circumference of a circle, centre *O*.
*PA* and *PB* are tangents to the circle.
Angle *APB* is 86°.

Work out the size of the angle marked *x*.

..... °

**Q6**

**(Total 2 marks)**

**7.** Work out $(3 \times 10^{6}) \times (5 \times 10^{-4})$

Give your answer in standard form.

..... **Q7**

**(Total 2 marks)**



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**8.** Prove that the recurring decimal $0.\dot{1}\dot{7} = \frac{17}{99}$

**Q8**

**(Total 2 marks)**

**9.** Simplify fully $\frac{2x^2 + 3x + 1}{x^2 - 3x - 4}$

**Q9**

.....

**(Total 3 marks)**



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**10.** The density of juice is 4 grams per $cm^3$.
The density of water is 1 gram per $cm^3$.

315 $cm^3$ of drink is made by mixing 15 $cm^3$ of juice with 300 $cm^3$ of water.

Work out the density of the drink.

..... grams per $cm^3$ **Q10**

**(Total 3 marks)**

**TOTAL FOR PAPER: 25 MARKS**

**END**



N 3 4 0 7 4 A 0 8 0 8

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Edexcel GCSE

# Mathematics 2381

Summer 2009

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**Mark Scheme (Results)**

Edexcel GCSE
Mathematics 2381

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| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | $3.4^2 - 2.6^2 = 4.8$<br>$4.8 \div 1.6 =$ | 3 | 2 | M1 for $3.4\times3.4-2.6\times2.6$ with evidence of multiplication or 11.56 or 6.76 or 4.8 or 289/25 or 169/25 or 24/5<br>A1 for 3 cao<br>(SC B1 for 7.335 or 1467/200) |
| 2 (a) | | 50 | 1 | B1 for 50 cao |
| (b) | | Alternate (angles) | 1 | B1 for alternate (angles) or co-interior (angles) or allied (angles) or any complete reason.<br>(accept Z angles) |
| 3 | <table><tr><td>$x$</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>$y$</td><td>-5</td><td>-2</td><td>1</td><td>4</td><td>7</td></tr></table> | Straight line | 3 | M2 for two correct points plotted or a correct straight line which does not cover the range $x = -1$ to $x = 3$<br>(M1 for one point correctly plotted or calculated or a straight line through one correct point)<br>A1 for correct line between -1 and 3<br>OR<br>M1 for line with correct gradient<br>M1 for line with correct $y$ intercept<br>A1 for correct line between -1 and 3 |
| 4 | $18 \times 5.8 =$ | 104.4 | 2 | M1 for $18 \times 5.8$<br>A1 for 104.4 cao |
| 5 (a) | $6x+9+2x+2=$ | $8x+11$ | 2 | M1 for $3\times2x+3\times3$ or $2\times x+2\times1$ or $6x+9$ or $2x+2$ or $8x$ or 11<br>A1 for $8x+11$ cao |
| (b) | $y^2+4y-3y-12$ | $y^2 + y - 12$ | 2 | M1 for 3 out of 4 terms of $y\times y+4\times y-3\times y-3\times4$ correct including signs, or 4 terms excluding signs<br>A1 for $y^2+y-12$ or $y^2+1y-12$ cao |



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| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 6 | $\frac{1}{2}(180-86) = 47$<br>$90-47=$ | 43 | 2 | M1 for $\frac{1}{2}(180-86)$ or 47 or for $90-'47'$ or<br>$\frac{1}{2}(180-"94")$<br>A1 for 43 cao |
| 7 | | $1.5\times10^3$ | 2 | B2 for $1.5\times10^3$ cao<br>(B1 for $a\times10^3$ , $a \neq 1.5$ or $1.5\times10^b$ ,$b \neq 3$ or $15\times10^2$ or 1500) |
| 8 | $x = 0.1717...$<br>$100x = 17.1717...$<br>$99x = 17$<br>$x = \frac{17}{99}$<br>or<br>1000x=171.7171…<br>10x= 1.7171…<br>990x=170<br>x=17/99 | Proof | 2 | M1 for valid method<br>eg $100x$ = 17.17…, $1x$ = 0.1717… and subtract<br>**OR**<br>$1000x$ = 171.7171.., $10x$ = 1.7171… and subtract<br>A1 for valid argument leading to $x = \frac{17}{99}$<br>**Alternative method** for long division<br>M1 for identifying 71 and 17 as remainders<br>A1 for correct statement |
| 9 | $\frac{\cancel{(x+1)}(2x+1)}{\cancel{(x+1)}(x-4)} =$ | $\frac{(2x+1)}{(x-4)}$ | 3 | B3 for $\frac{(2x+1)}{(x-4)}$<br>(B1 for $(x+1)(2x+1)$ and/or B1 for $(x+1)(x-4)$ ) |



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| 5383H/10 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 10 | Mass of water = 300×1= 300g<br>Mass of juice=15×4=60g<br><br>Total mass = 360<br>Total volume = 315<br>Density = 360÷315 | $1\frac{1}{7}$ | 3 | M1 for 300×1 or 15×4 or 60 or 360 seen<br>M1 for $\frac{'300\times1'+'15\times4'}{'300+15'}$<br>A1 for $1\frac{1}{7}$ oe or 1.14... |



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| Centre No. | | | | | | Paper Reference | | | | | | | | Surname | Initial(s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Candidate No. | | | | | | 5 | 3 | 8 | 3 | H | / | 1 | 0 | Signature | |

Paper Reference(s)

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# Edexcel GCSE

## Mathematics (Modular) – 2381

Paper 10 (Calculator)

# Higher Tier



Unit 2 Stage 2

Tuesday 3 March 2009 – Afternoon

Time: 30 minutes

**Materials required for examination**
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator.
Tracing paper may be used.

**Items included with question papers**
Nil

### Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
**You must NOT write on the formulae page.**
**Anything you write on the formulae page will gain NO credit.**
If you need more space to complete your answer to any question, use additional answer sheets.

### Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 8 questions in this question paper. The total mark for this paper is 25.
There are 8 pages in this question paper. Any blank pages are indicated.
**Calculators may be used.**
If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

### Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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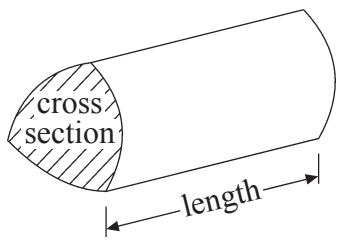
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**GCSE Mathematics 2381**

Formulae: Higher Tier

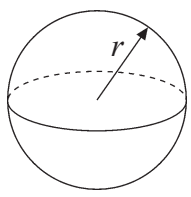
**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

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



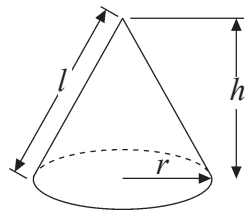

**Volume of sphere** $= \frac{4}{3}\pi r^3$

**Surface area of sphere** $= 4\pi r^2$

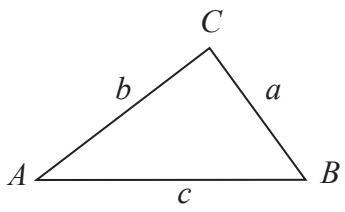



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi r l$




**In any triangle ABC**




**The Quadratic Equation**

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** $= \frac{1}{2}ab \sin C$



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**Answer ALL EIGHT questions.**

**Write your answers in the spaces provided.**

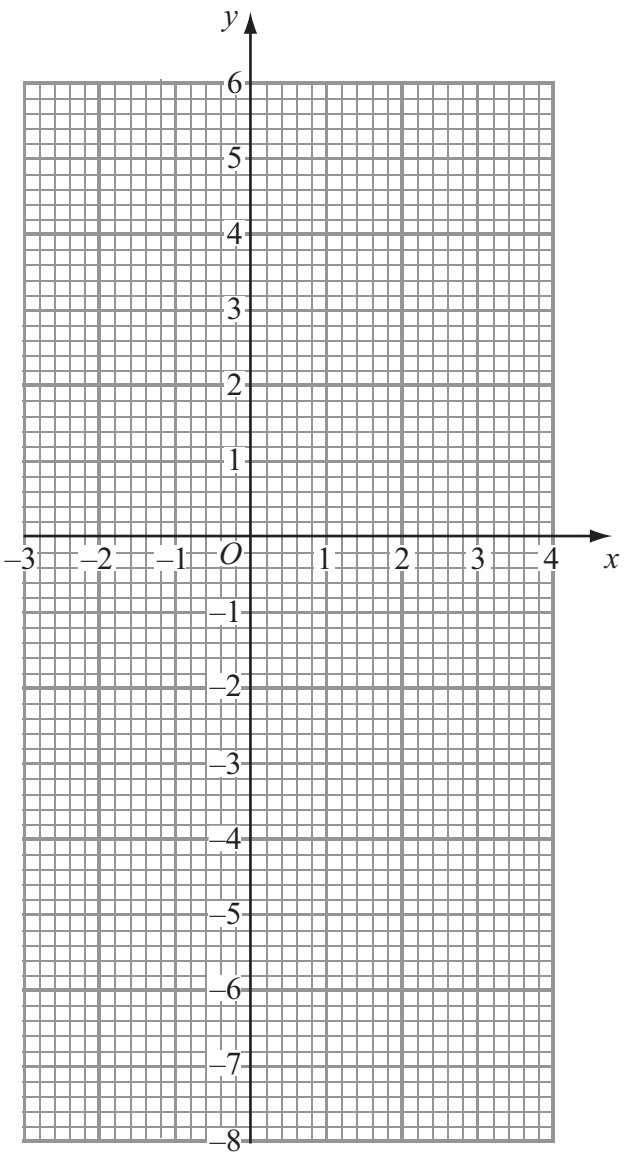
**You must write down all stages in your working.**

**1.** (a) Complete the table of values for $y = 2x - 3$

| $x$ | −2 | −1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| $y$ | −7 | | −3 | −1 | | 3 |

**(2)**

(b) On the grid, draw the graph of $y = 2x - 3$




**(2)** **Q1**

**(Total 4 marks)**





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**2.** Find 15% of £200

£ .....

**(Total 1 mark)**

**Q2**

**3.** (a) Use your calculator to work out $\dfrac{26.4+8.2}{\sqrt{5.76}}$ as a decimal.

Write down all the figures on your calculator display.

.....

**(2)**

(b) Write your answer to part (a) correct to 2 decimal places.

.....

**(1)**

**(Total 3 marks)**

**Q3**



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**4.** (a) Expand and simplify $4(2x + 5) + 2(3x - 2)$

.....

**(2)**

(b) Expand and simplify $(x + 5)(x + 8)$

.....

**(2)**

**Q4**

**(Total 4 marks)**

**5.** Work out $(6.4 \times 10^5) \times (5 \times 10^4)$

Give your answer in standard form.

.....

**Q5**

**(Total 2 marks)**



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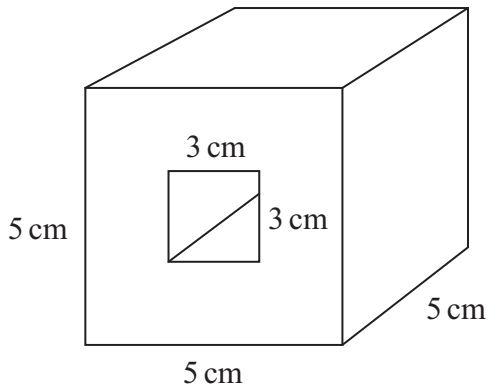


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**6.**

Diagram **NOT** accurately drawn




The solid shape, shown in the diagram, is made by cutting a hole all the way through a wooden cube.
The cube has edges of length 5 cm.
The hole has a square cross section of side 3 cm.

(a) Work out the volume of wood in the solid shape.

..... $cm^3$
**(2)**

The mass of the solid shape is 64 grams.

(b) Work out the density of the wood.

..... grams per $cm^3$
**(2)**

**Q6**

**(Total 4 marks)**



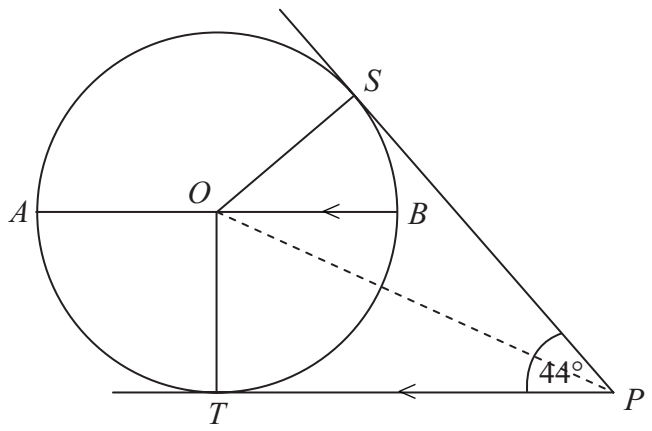
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**7.**

Diagram **NOT** accurately drawn




The diagram shows a circle, centre $O$.
$A$, $S$, $B$ and $T$ are points on the circumference of the circle.

$PT$ and $PS$ are tangents to the circle.
$AB$ is parallel to $TP$.

Angle $SPT = 44°$.

Work out the size of angle $SOB$.

.....°

**(Total 4 marks)**

**Q7**







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**8.** (a) Factorise $x^2 - y^2$

.....

**(1)**

Hence, or otherwise,

(b) factorise $(x + 1)^2 - (y + 1)^2$

.....

**(2)** **Q8**

**(Total 3 marks)**

**TOTAL FOR PAPER: 25 MARKS**

**END**



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# Mathematics 2381

March 2009

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## Mark Scheme (Results)

Edexcel GCSE
Mathematics 2381

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| 5383H/10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 1 | (a) | <table><tr><td>$x$</td><td>−2</td><td>−1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>$y$</td><td>−7</td><td>**−5**</td><td>−3</td><td>−1</td><td>**1**</td><td>3</td></tr></table> | Table | 2 | B2 for 2 correct entries<br>(B1 for1 correct entry) |
| | (b) | | Graph | 2 | B2 for straight line from (-2, -7) to (3, 3)<br>(B1 for 5 of their points correctly plotted<br>**or** single straight line passing through (0, -3) from $x$ = -2 to +3<br>**or** for a straight line with gradient 2 from $x$ = -2 to +3<br>**or** correct straight line that passes through 3 correct points) |
| 2 | | $\frac{15}{100} \times 200$ or 20 + 10 | 30 | 1 | B1 cao |
| 3 | (a) | $\frac{26.4+8.2}{\sqrt{5.76}} = \frac{34.6}{2.4}$ | 14.4166(666) | 2 | B2 14.4166(6667) accept $\frac{173}{12}$ or $14\frac{5}{12}$ or $14.41\dot{6}$<br>(B1 for 34.6 or 2.4 seen) |
| | (b) | | 14.42 | 1 | B1 ft from "14.4166…" assuming original is to 3 d.p. or more |
| 4 | (a) | $4(2x+5) + 2(3x - 2)$<br>$8x + 20 + 6x - 4$ | $14x + 16$ | 2 | M1 for either $8x + 20$ or $6x - 4$ or $4 \times 2x + 4 \times 5$ or $2 \times 3x - 2 \times 2$ or $14x$ or $+16$<br>A1 for $14x + 16$ |
| | (b) | $x^2 + 5x + 8x + 40$ | $x^2 + 13x + 40$ | 2 | B2 cao<br>(B1 for 3 or 4 of the 4 terms correct, can be implied by $x^2 + 13x + n$ or $nx^2 + 13x + 40$) |
| 5 | | | $3.2 \times 10^{10}$ | 2 | B2 cao<br>(B1 $3.2 \times 10^n$, $n$ an integer $\neq 10$, or $32 \times 10^9$ or 32 000 000 000 or 3.2 exp10 or $3.2^{\times 10^{10}}$ seen) |



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| 5383H/10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 6 | (a) | $5^3 - 5 \times 3 \times 3$<br>125 – 45<br><br>$(5 \times 5 - 3 \times 3) \times 5$<br>$(25 - 9) \times 5$<br>$16 \times 5$ | 80 | 2 | M1 for attempt to find volume of cube (e.g. 5 × 5 × n where $n \neq 6$) and subtract volume of the hole (e.g. 3 × 3 × $n$ where $n \neq 6$) (needs to be dimensionally correct)<br>A1 cao<br>**Alternative method**<br>M1 for attempt to find area of the cross section and multiply by the depth of the prism (depth ≠ 6)<br>A1 cao |
| | (b) | 64 ÷ 80 | 0.8 | 2 | M1 ft 64 ÷ "80"<br>A1 ft (to 2 sf or better) |
| 7 | | *SOT* = 360 – (90+90+44)<br>= 136°<br><br><br><br>*SOT* = 360 – (90+90+44)<br>= 136°<br>136 – 90<br><br><br><br>*SOT* = 360 – (90+90+44)<br>= 136°<br>136 ÷ 2 – 22 | 46° | 4 | **Using triangle** *SOP*<br>B1 recognition of tangent/radius property (can be awarded for a right angle marked on the diagram)<br>M1 180 – 90 – 22 or sight of 68°<br>M1 SOP – 22<br>A1 cao<br><br>**Using quadrilateral SPTO**<br>B1 recognition of tangent/radius property (can be awarded for a right angle marked on the diagram)<br>M1 360 – (2× 90 + 44) or sight of 136°<br>M1 *SOT* – 90<br>A1 cao<br>**Alternative method for quadrilateral** *SPTO*<br>B1 recognition of tangent/radius property (can be awarded for a right angle marked on the diagram)<br>M1 360 – (2× 90 + 44) or sight of 136°<br>M1for 136 ÷ 2 – 22<br>A1 cao |



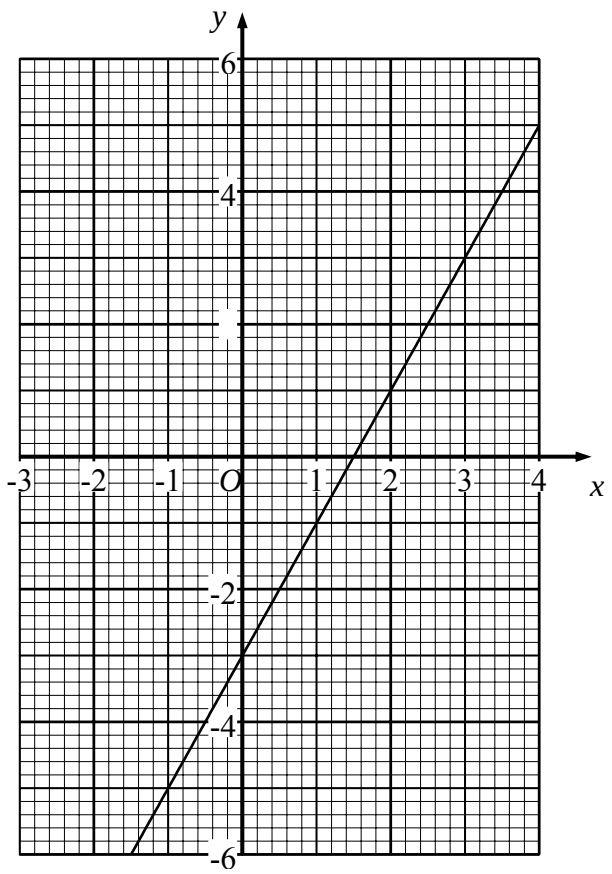
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| 5383H/10 | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 8 | (a) | | $(x+y)(x-y)$ | 1 | B1 cao |
| | (b) | $((x+1)-(y+1))\times$<br>$((x+1)+(y+1))$<br><br>$x^2+2x+1-(y^2+2y+1)$<br>$=x^2-y^2+2x-2y$<br>$=$<br>$(x-y)(x+y)+2(x-y)$ | $(x-y)(x+y+2)$ | 2 | M1 for attempt to replace $x$ by $(x+1)$ and $y$ by $(y+1)$<br>A1 cao<br><br>**Alternative**<br>M1 for expanding both brackets to get<br>$\boldsymbol{x}^2+2\boldsymbol{x}+1$ ***and*** $\boldsymbol{y}^2+2\boldsymbol{y}+1$<br>A1 cao |



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**Graph for Q01b**






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