New Specification

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018

Mathematics

StemUp Model Solution

Unit M1
(With calculator)
Foundation Tier



[GMC11]

GMC11

THURSDAY 24 MAY, 9.15am–11.00am

TIME

1 hour 45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in black ink only. **Do not write with a gel pen.**
All working should be clearly shown since marks may be awarded for partially correct solutions.
When rounding is necessary give answers to **2 decimal places** unless stated otherwise.
Answer **all thirty** questions.

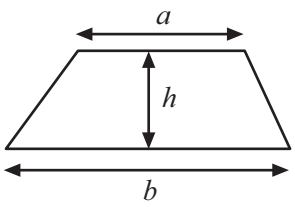
INFORMATION FOR CANDIDATES

Functional Mathematics is assessed in this unit.
The total mark for this paper is 100.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You may use a calculator.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

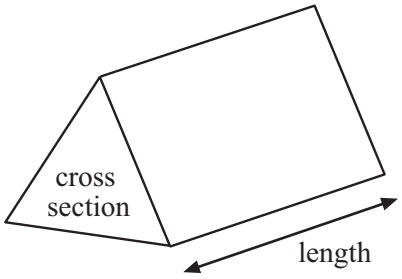
11722

Formula Sheet

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

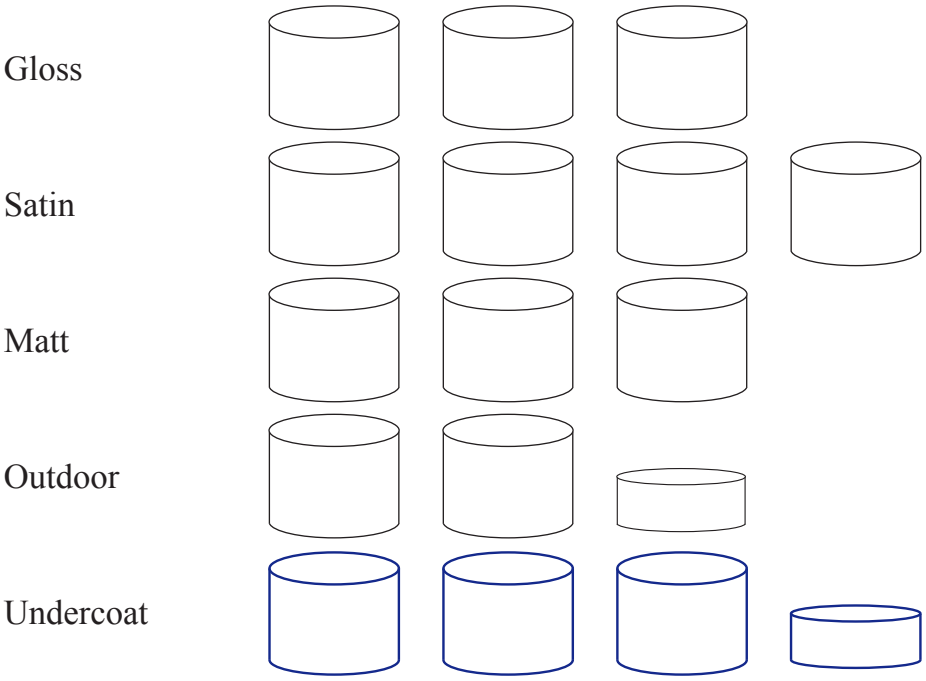


Volume of prism = area of cross section × length

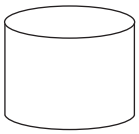


11722

1 The pictogram shows the amount of paint sold.



(a) 30 litres of matt paint were sold. Complete the key.



represents 10 litres [1]

(b) How many litres of satin paint were sold?

Answer 40 litres [1]

(c) How many more litres of gloss than outdoor paint were sold?

30 − 25 = 5

Answer 5 litres [1]

(d) 160 litres of paint were sold.

Complete the pictogram for undercoat. [2]

160 − (30 + 40 + 30 + 25) = 35 litres = 3½ symbols

[Turn over

2 **(a)** Draw a straight line 11.7 centimetres long in the space below.



[1]

(b) Change 11.7 centimetres to millimetres.

11.7 × 10 = 117

Answer 117 mm [1]

3 A plumber works on a job for 3 hours.

His call-out charge is £30

(a) Use this formula to calculate the cost of the job.

Cost (£) = number of hours worked × 15 + call-out charge

Cost = 3 × 15 + 30
= 45 + 30 = 75

Answer £ 75 [1]

(b) How much does the plumber charge per hour?

charge per hour = £15 (the × 15 in the formula)

Answer £ 15 [1]

4 Jack asked 10 students how they travel to school.

They said

bus walk bus bus cycle walk walk car cycle walk

(a) Which way of travelling is the mode?

walk 4, bus 3, cycle 2, car 1

Answer walk [1]

(b) What percentage of students cycle to school?

2 out of 10 cycle

$\frac{2}{10} \times 100 = 20\%$

Answer 20 % [1]

[Turn over

5 Eva works in a bakery.

(a) (i) Eva earns £7.85 an hour.

She works 35 hours each week.

How much does Eva earn each week?

7.85 × 35 = 274.75

Answer £ 274.75 [1]

(ii) How much does Eva earn in a year?

274.75 × 52 = 14287

Answer £ 14287 [2]

(b) Eva's boss earns twenty-one thousand three hundred and fifty pounds a year.

Write this amount in figures.

Answer £ 21350 [1]

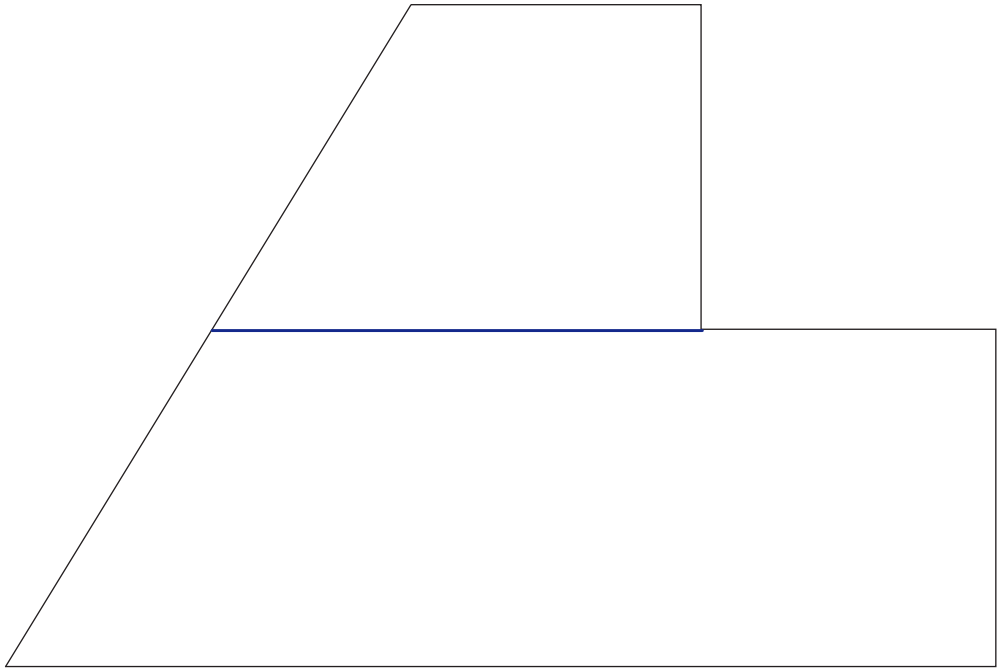
(c) The bakery uses 5227 kg of flour every year.

Round this amount to the nearest hundred kilograms.

5227 → 5200

Answer 5200 kg [1]

6 A polygon is shown.



(a) What is the name of this polygon? Answer Hexagon [1]

(b) How many **interior** angles are right angles?

Answer 3 [1]

(c) Draw one straight line to split the polygon into two trapeziums. [1]

[Turn over

7 Part of the menu in McFarmers restaurant is shown.

McFarmers		
Wrap	**Salad**	**Drink**
Cheese £1.75	Green 99p	Small 60p
Chicken £1.95	Bean £1.25	Medium 90p
Beef £2.65	Tuna £1.55	Large £1.15

(a) Ali orders a Cheese Wrap, a Tuna Salad and a Small Drink.

How much change does he get from £5?

1.75 + 1.55 + 0.60 = 3.90
5.00 − 3.90 = 1.10

Answer £ 1.10 [2]

(b) Beth spends £4.09 on a Wrap, Salad and Drink.

List the items she orders.

Chicken + Green + Large
1.95 + 0.99 + 1.15 = 4.09

Answer Chicken Wrap Green Salad Large Drink [1]

8 Kim's locker passcode is a three-digit number.

All three digits are different.

The first digit is a factor of 14

The second digit is a factor of 15

The third digit is the **product** of the first two digits.

What is Kim's passcode?

Factors of 14: 1, 2, 7, 14
Factors of 15: 1, 3, 5, 15
2 × 3 = 6 (digits 2, 3, 6 all different)
(1 × 3 = 3 repeats a digit, 7 × 3 = 21 too big)

Answer First digit __2__ Second digit __3__ Third digit __6__ [2]

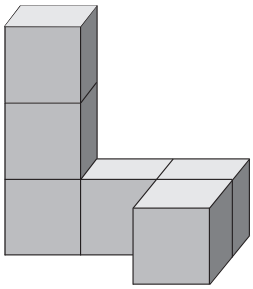
[Turn over



9 **(a)** This structure is built from 1 cm cubes.

Jay thinks the volume of the structure is 6 cm^2

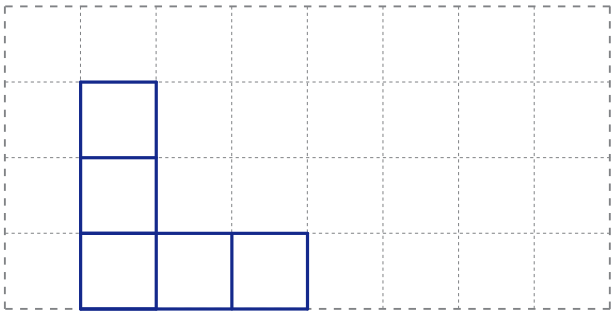
Explain why he is wrong.



Front

Answer *Volume is in cm^3, not cm^2. It is 6 cm^3* [1]

(b) Draw the front elevation of this structure.



[2]

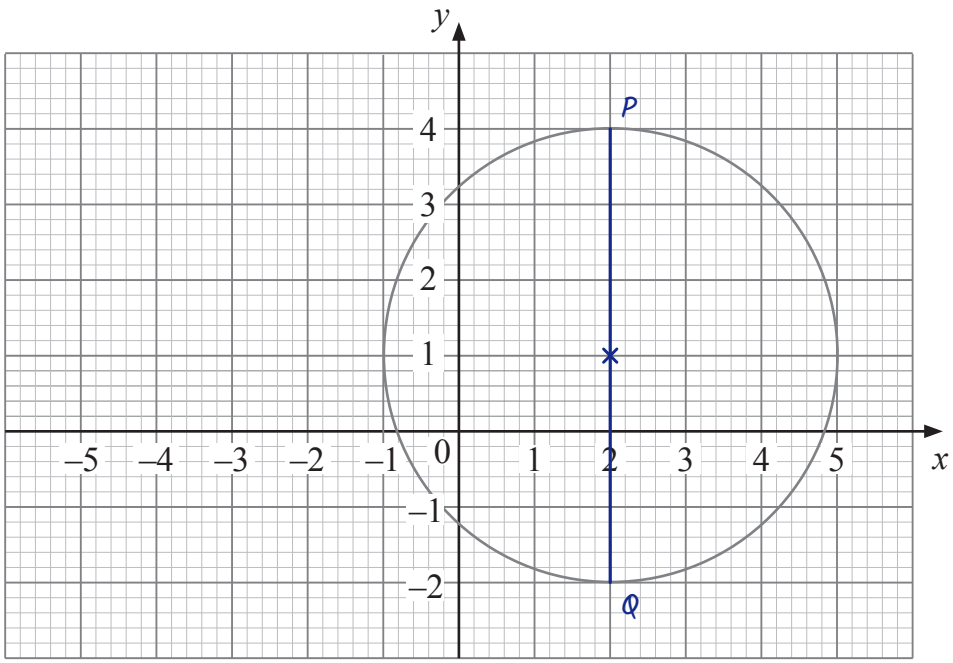
10 On a Tuesday, it was 72 days until Jill's birthday.

What day of the week was Jill's birthday?

72 ÷ 7 = 10 weeks remainder 2
10 × 7 = 70, so 72 days = 10 weeks + 2 days
Tuesday + 2 days = Thursday

Answer Thursday [2]

11



(a) What are the co-ordinates of the centre of the circle?

Answer (2 , 1) [1]

(b) P is the point (2, 4).
Draw the diameter PQ. [2]

(c) What are the co-ordinates of Q? Answer (2 , −2) [1]

[Turn over

12 The temperature in some cities is shown in the table below.

Riga	–3°C
Helsinki	–11°C
Toronto	–6°C
Moscow	–8°C
Stockholm	–1°C

(a) List the temperatures in **ascending** order.

Answer −11 , −8 , −6 , −3 , −1 [2]

(b) How much warmer is Moscow than Helsinki?

−8 − (−11) = 3

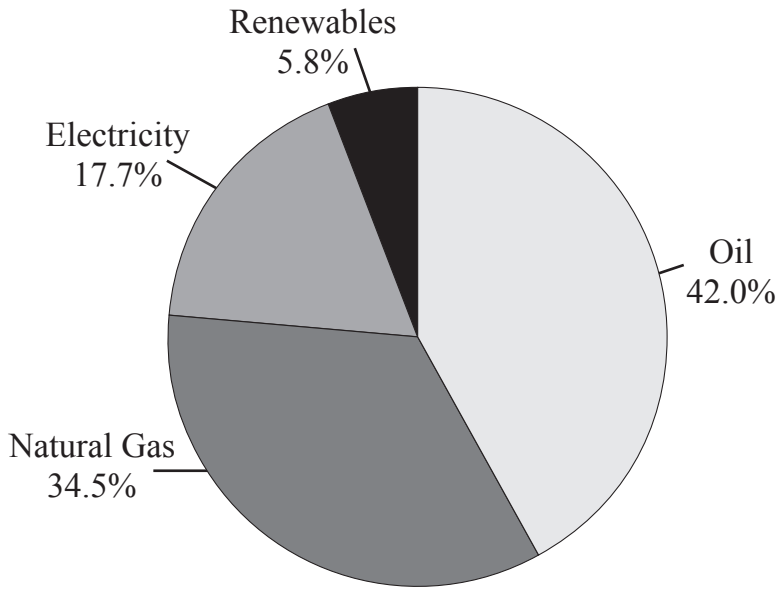
Answer 3 °C [1]

(c) What is the difference in temperature between Helsinki and Stockholm?

−1 − (−11) = 10

Answer 10 °C [1]

13 This pie chart shows energy use by type of fuel.



(a) Which type of fuel is used most?

Answer Oil [1]

(b) **Measure** the angle for electricity.

Answer 64 ° [1]

(c) Sean thinks about $\frac{3}{4}$ of energy use comes from oil and natural gas.

Explain why Sean is correct.

Answer 42.0 + 34.5 = 76.5%, which is about 75%

and 75% = ¾, so about ¾ comes from oil and natural gas [1]

(d) Complete the statement below with a suitable number in the box.

The fraction $\frac{\text{renewables}}{\text{electricity}}$ is about $\frac{1}{\boxed{3}}$. [1]

5.8 ÷ 17.7 ≈ 0.33 ≈ ⅓

[Turn over

14 The total population of Great Britain and Ireland is 70 million.

Information about this population is given in the table.

England	54.9 million
Northern Ireland	1.9 million
Republic of Ireland	4.6 million
Scotland	5.5 million
Wales	

(a) What is the population of Wales?

54.9 + 1.9 + 4.6 + 5.5 = 66.9
70 − 66.9 = 3.1

Answer 3.1 million [2]

(b) Sue thinks the population of Northern Ireland and Republic of Ireland makes up more than 10% of the total population of Great Britain and Ireland.

Do you agree?

Explain your answer.

10% of 70 million = 7 million
NI + ROI = 1.9 + 4.6 = 6.5 million
6.5 < 7, so less than 10%

Answer No because 1.9 + 4.6 = 6.5 million, which is less than 10% of 70 million = 7 million [2]

15 **(a)** Work out the size of the angle marked x.

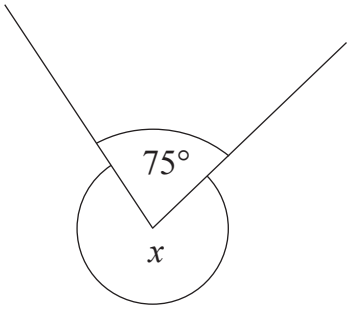


diagram not
drawn accurately

360 − 75 = 285

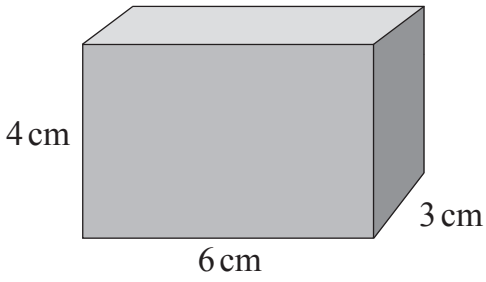
Answer 285 ° [1]

(b) Circle the name of the quadrilateral with rotational symmetry of order 2

square kite parallelogram trapezium [1]

Look at the box below.

(c) **(i)** How many 1 cm cubes are needed to fill this box?



6 × 4 × 3 = 72

Answer 72 cubes [1]

(ii) What is the perimeter of the top face of the box?

6 + 3 + 6 + 3 = 18

Answer 18 cm [1]

[Turn over

16 **(a)** Seven factory workers take part in a charity swim.

Altogether they swim 179 lengths of a pool.

How many lengths does each worker swim on average?

Give your answer correct to **1 decimal place**.

179 ÷ 7 = 25.571428...
= 25.6 (1 d.p.)

Answer 25.6 lengths [2]

The seven factory workers **and** their manager earn these weekly wages:

£294, £245, £300, £288, £300, £259, £290 and £850

(b) What is the median weekly wage?

245, 259, 288, 290, 294, 300, 300, 850
(290 + 294) ÷ 2 = 292

Answer £ 292 [2]

(c) Which of these is **most** affected by the manager's weekly wage of £850?

range median mean mode

Answer range [1]

17 **(a)** Write 2 **prime** numbers between 60 and 70

Answer 61 and 67 [2]

(b) Which of these is both a **square** number and a **cube** number?

8 16 36 64 100

$64 = 8^2 = 4^3$

Answer 64 [1]

(c) What is the **square root** of one million?

$1000 \times 1000 = 1\,000\,000$

Answer 1000 [1]

[Turn over

18 **(a)** Bikes normally cost £b each.

In a sale they are each reduced by £30

Write an expression for the cost of a bike in the sale.

Answer $b - 30$ [1]

(b) Cycling helmets normally cost £h each.

In a sale they are each reduced to half-price.

Write an expression for the cost of a cycling helmet in the sale.

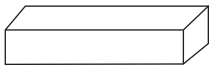
Answer $\frac{h}{2}$ [1]

(c) Write an expression for the total cost of 4 bikes and 4 cycling helmets in the sale.

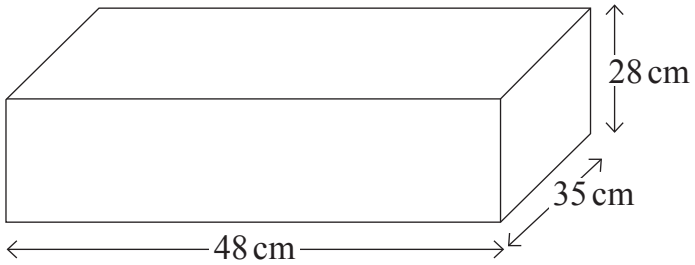
$4 \times (b - 30) + 4 \times \frac{1}{2}h$
$= 4b - 120 + 2h$

Answer $4b - 120 + 2h$ [2]

19 The packaging for a tube of toothpaste is a cuboid measuring 16 cm × 5 cm × 4 cm.



The manufacturer wants to be able to pack 150 of these tubes into a cardboard box.
The box is a cuboid.
The box measures 48 cm × 35 cm × 28 cm.



Will the box be big enough to hold 150 tubes of toothpaste in their packaging?
You must show working to explain your answer.

48 ÷ 16 = 3
35 ÷ 5 = 7
28 ÷ 4 = 7
3 × 7 × 7 = 147 tubes fit
(check: 48 × 35 × 28 = 47040, 16 × 5 × 4 = 320,
47040 ÷ 320 = 147 at most)
147 < 150, so the box is not big enough

Answer No [3]

[Turn over

20 Male and female care assistants work in a nursing home.

Some can work weekdays only, some can work weekends only and some can work both.

(a) Complete the two-way table below.

	Weekdays only	**Weekends only**	**Both**	**Total**
Male	1	5	2	8
Female	2	3	8	13
Total	3	8	10	21

[2]

(b) How many male care assistants can work on weekends?

5 + 2 = 7

Answer 7 [1]

21

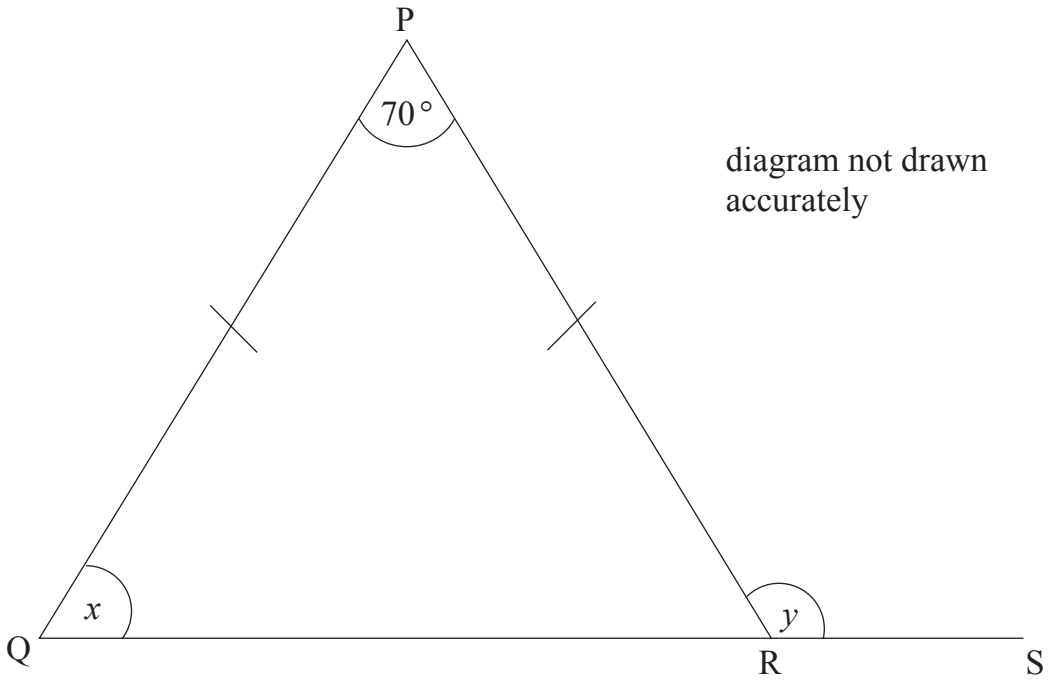


diagram not drawn accurately

PQR is an isosceles triangle with PQ = PR.

QRS is a straight line.

(a) Work out the size of the angle marked x.

angle Q = angle R (isosceles triangle)
x = (180 − 70) ÷ 2
= 110 ÷ 2 = 55

Answer 55 ° [2]

(b) Work out the size of the angle marked y.

180 − 55 = 125 (angles on a straight line)

Answer 125 ° [1]

[Turn over

22 **(a)** Write $\frac{3}{8}$ as a decimal.

$3 \div 8 = 0.375$

Answer 0.375 [1]

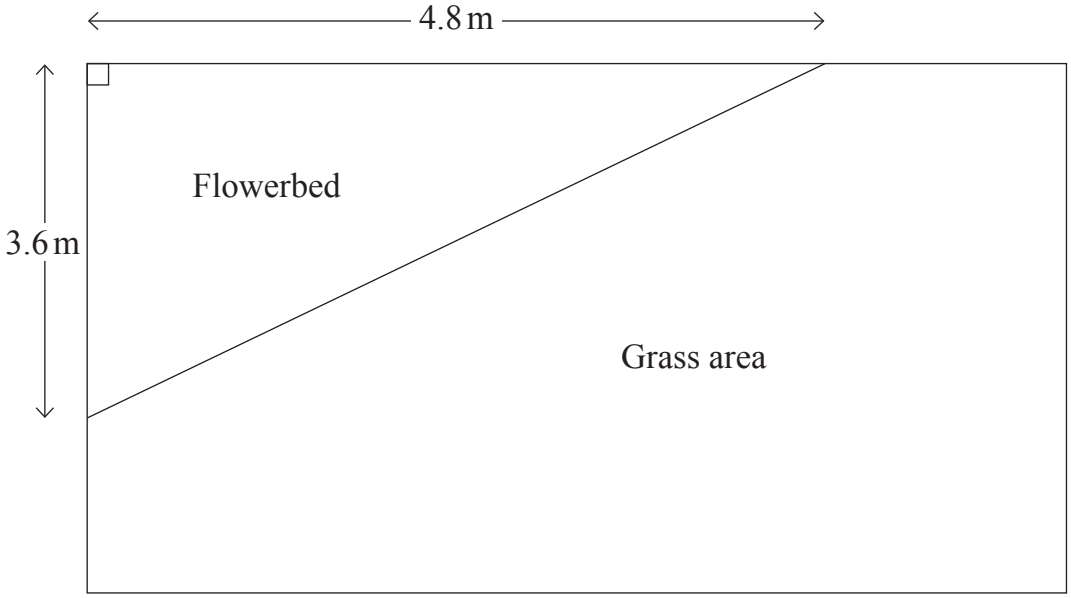
(b) What percentage is £9 of £16?

$\frac{9}{16} \times 100 = 56.25$

Answer 56.25 % [2]

23 A garden has a flowerbed in the corner.

A diagram of the garden is shown below.



Calculate the area of the flowerbed.

Area = ½ × 3.6 × 4.8
= 17.28 ÷ 2
= 8.64

Answer 8.64 m^2 [2]

[Turn over

24 The life expectancy for males in 12 countries in Africa for 2015 is shown in the following stem and leaf diagram.

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

Key: 5 | 3 means 53 years

(a) How many of these countries had a life expectancy for males of less than 58 years?

49, 50, 55, 55, 56 → 5 countries

Answer 5 [1]

(b) For the above data work out

(i) the median,

12 values: 6th = 58, 7th = 58
median = (58 + 58) ÷ 2 = 58

Answer 58 years [1]

(ii) the range.

73 – 49 = 24

Answer 24 years [1]

(c) In 1975 the life expectancy for males in the same 12 countries had a median of 49 years and a range of 30 years.

Compare the life expectancy for males in these 12 countries in **2015** with the life expectancy for males in **1975**

The median is higher in 2015 (58 compared with 49), so males lived longer on average. The range is smaller in 2015 (24 compared with 30), so life expectancy was more consistent. [2]

25 John has a telephone with the following costs.

Line rental: £18.99 per month
Call charge: 5.8p per minute

Last month John made calls lasting 385 minutes.

Work out his telephone bill for last month.

calls: 385 × 5.8 = 2233p = £22.33
bill = 22.33 + 18.99
= £41.32

Answer £ *41.32* [3]

[Turn over

26

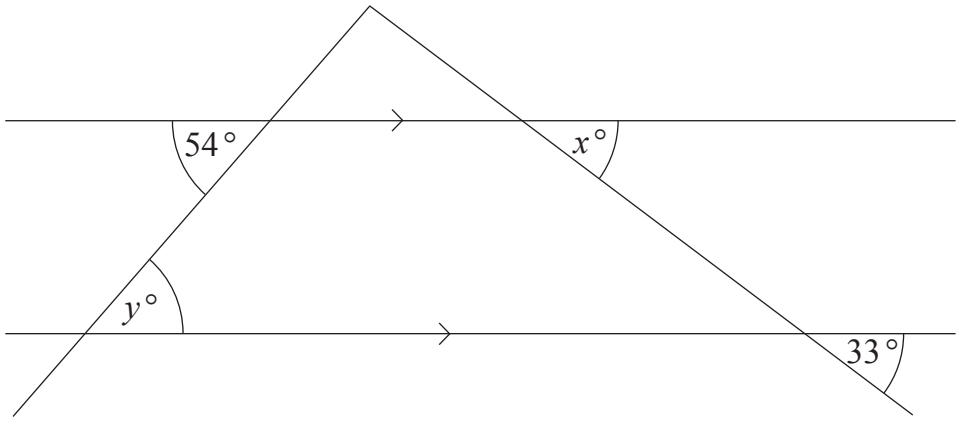


diagram not drawn accurately

Write down the values of x and y.

$x = 33$ (alternate angles)
$y = 54$ (corresponding angles)

Answer $x =$ 33 [1]

Answer $y =$ 54 [1]

27 Calculate $\dfrac{\sqrt{1.1 \times 4.4}}{(3.2 - 2.65)}$

$\sqrt{(1.1 \times 4.4)} = \sqrt{4.84} = 2.2$
$3.2 - 2.65 = 0.55$
$2.2 \div 0.55 = 4$

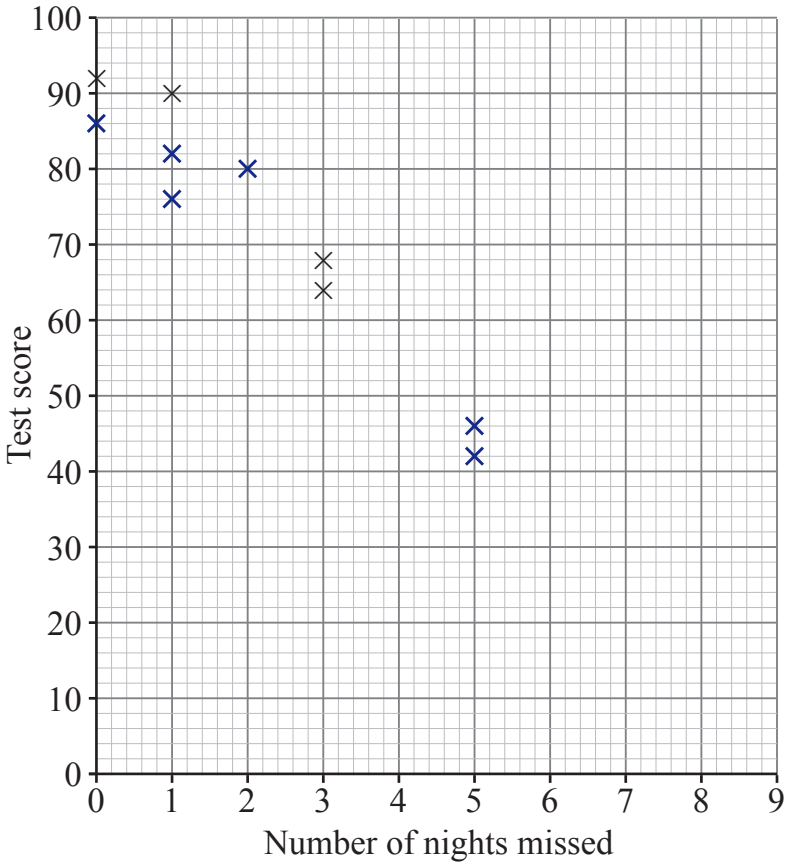
Answer 4 [2]

28 A group of pupils do a first aid course over 8 nights.
There is a test at the end of the course.

The table shows the number of nights each pupil misses and their test score.

Pupil	A	B	C	D	E	F	G	H	I	J
Number of nights missed	**0**	**3**	**1**	**3**	2	1	0	5	1	5
Test score	**92**	**64**	**90**	**68**	80	82	86	42	76	46

The first 4 points are plotted on the scatter graph.
Plot the last 6 points.



[2]

[Turn over

29 **(a)** Multiply out and simplify

$$3(x + 2) + 5(x - 1)$$

$3x + 6 + 5x - 5$
$= 8x + 1$

Answer $8x + 1$ [3]

(b) Factorise

$$4x + 10$$

$4x + 10 = 2 \times 2x + 2 \times 5$

Answer $2(2x + 5)$ [1]

30 **(a)** Pat buys 30 boxes of crisps.

Each **box** contains 48 **packets** of crisps.

He sells 80% of the crisps at 60p a packet.

(i) How many packets does he sell at this price?

30 × 48 = 1440 packets
0.8 × 1440 = 1152

Answer 1152 [2]

(ii) How much in total does he sell them for?

1152 × 0.60 = £691.20

Answer £ 691.20 [1]

(b) He sells the rest at 20p a packet.
Pat paid £25 for each box of crisps.

Does Pat make a profit or loss, and how much is this profit or loss?

rest: 1440 − 1152 = 288 packets
288 × 0.20 = £57.60
total sales = 691.20 + 57.60 = £748.80
cost = 30 × 25 = £750
750 − 748.80 = £1.20, so a loss

Answer Pat makes a loss of £ 1.20 [3]

THIS IS THE END OF THE QUESTION PAPER

BLANK PAGE

DO NOT WRITE ON THIS PAGE

BLANK PAGE

DO NOT WRITE ON THIS PAGE

DO NOT WRITE ON THIS PAGE

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
Total Marks	

Examiner Number

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA will be happy to rectify any omissions of acknowledgement in future if notified.