

Write your name here

Surname	Other names
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**Pearson Edexcel**  
**Level 1 / Level 2**  
**GCSE (9–1)**

Centre Number

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Candidate Number

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# Mathematics

## Paper 1 (Non-Calculator)

**Foundation Tier**

Thursday 25 May 2017 – Morning  
**Time: 1 hour 30 minutes**

Paper Reference

**1MA1/1F**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

Total Marks



### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**

### Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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6/6/6/6/6/7/7/4/

**.CG Maths.**  
Worked Solutions



Pearson

Please note that these worked solutions have neither been provided nor approved by Pearson Education and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue should be written in the exam.

Anything written in green in a rectangle doesn't have to be written in the exam.

If you find any mistakes or have any requests or suggestions, please send an email to [curtis@cgmaths.co.uk](mailto:curtis@cgmaths.co.uk)

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Work out the value of  $2^4$

2, 4, 8, 16 ← Listing out the powers of 2 by starting with 2 and keep multiplying by 2 until the 4th number is reached

16

(Total for Question 1 is 1 mark)

2 Write 7.26451 correct to 3 decimal places.

The 5 in the 4th decimal place causes the 4 in the 3rd decimal place to round up to a 5. Everything after the 3rd decimal place is then set to 0 and is ignored

7.265

(Total for Question 2 is 1 mark)

3 (a) Simplify  $7 \times e \times f \times 8$

Multiplication can be done in any order. First doing  $7 \times 8 = 56$  then writing the e and f next to this means that they are multiplied

56ef

(1)

(b) Solve  $\frac{x}{5} = 2\frac{1}{2}$

$x = 2\frac{1}{2} \times 5$  ← Multiplying both sides by 5 eliminates the denominator on the left and gets x on its own

$= 10 + 2.5$  ←  $2 \times 5 = 10$  and  $\frac{1}{2} \times 5 = 2.5$ . Then adding these together

$x = 12.5$

(1)

(Total for Question 3 is 2 marks)

4 Write  $\frac{4}{5}$  as a percentage.

$\frac{0 \ 2 \ 0}{5 \ 1 \ 0 \ 0} \times 4$  ← To convert a fraction to a percentage it can be multiplied by 100.  $\frac{4}{5} \times 100$  can be worked out by doing  $100 \div 5$  then the result multiplied by 4

80

%

(Total for Question 4 is 1 mark)

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2

.CG Maths.

DO NOT WRITE IN THIS AREA

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5 Work out 60% of 70

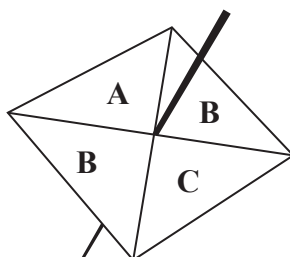
7 × 6 ←

10% of 70 can be found by dividing the 70 by 10 to get 7. Then multiplying the value of 10% by 6 works out that 60% of 70 is 42

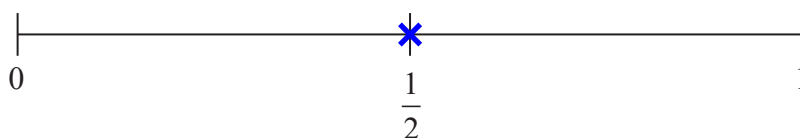
42

(Total for Question 5 is 2 marks)

6 Sammy spins a fair 4-sided spinner.



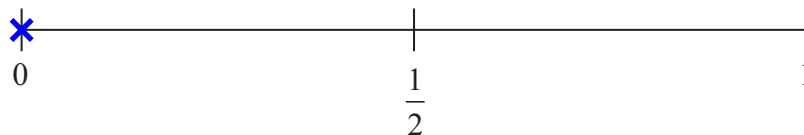
(i) On the probability scale, mark with a cross (×) the probability that the spinner will land on B.



2 out of the 4 equally likely outcomes are B. 2/4 simplifies to 1/2

(1)

(ii) On the probability scale, mark with a cross (×) the probability that the spinner will land on F.



There are no F so this is impossible

(1)

(Total for Question 6 is 2 marks)



## 7 Fahima buys

- 2 packets of bread rolls costing £1.50 for each packet
- 1 bottle of ketchup costing £1.60
- 3 packets of sausages

Fahima pays with a £10 note.  
She gets 30p change.

Fahima works out that one packet of sausages costs £2.30

Is Fahima right?

You must show how you get your answer.

$$\begin{array}{r}
 2.30 \\
 \times 3 \\
 \hline
 6.90 \\
 +1.50 \\
 +1.50 \\
 +1.60 \\
 \hline
 11.50 \\
 \text{\scriptsize 2}
 \end{array}$$

Multiplying the £2.30 by 3 works out that 3 packets of sausages would cost £6.90  
 Adding the costs of 2 packets of bread rolls and 1 bottle of ketchup works out that the total cost would be £11.50  
 No ← The cost would be more than £10 so there is no way that there would be 30p change. Fahima is not right

(Total for Question 7 is 3 marks)

8 (a) Work out  $\frac{5}{8} \times \frac{3}{4}$

To multiply fractions: multiply the numerators and multiply the denominators.  $5 \times 3 = 15$  and  $8 \times 4 = 32$

$$\frac{15}{32}$$

(1)

(b) Work out  $\frac{2}{3} - \frac{1}{4}$

$$\frac{8}{12} - \frac{3}{12}$$

To subtract fractions: make the denominators the same then subtract the numerators. Multiplying both the numerator and denominator of  $\frac{2}{3}$  by 4 and multiplying both the numerator and denominator of  $\frac{1}{4}$  by 3 makes it so that both denominators are 12

$8 - 3 = 5$  and the denominator of 12 stays the same

$$\frac{5}{12}$$

(2)

(Total for Question 8 is 3 marks)

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9 Sean works for a company.  
His normal rate of pay is £12 per hour.

When Sean works more than 8 hours a day, he is paid overtime for each hour he works more than 8 hours.

Sean's rate of overtime pay per hour is  $1\frac{1}{4}$  times his normal rate of pay per hour.

On Monday Sean worked for 10 hours.

Work out the total amount of money Sean earned on Monday.

$12 \times 8 = 96$  ← Multiplying the normal rate of pay by the 8 hours works out that he is paid £96 for these hours

$12 \div 4$  ← Dividing the normal rate of pay by 4 works out that  $\frac{1}{4}$  of the normal rate of pay is £3 per hour

$12 + 3$  ← Adding the value of  $\frac{1}{4}$  of the normal rate of pay to the normal rate of pay works out that  $1\frac{1}{4}$  times the normal rate of pay is £15 per hour, which is the rate of overtime pay per hour

$15 \times 2$  ←  $10 - 8 = 2$  hours of overtime. Multiplying the rate of overtime pay per hour by these 2 hours works out that he is paid £30 for overtime

$\begin{array}{r} 96 \\ +30 \\ \hline 126 \end{array}$  ← Adding the £30 for 2 hours of overtime to the £96 for the first 8 hours works out that the total amount of money Sean earned on Monday is £126

£ ..... 126 .....

(Total for Question 9 is 4 marks)



10 A farmer has 20 boxes of eggs.  
There are 6 eggs in each box.

Write, as a ratio, the number of eggs in two boxes to the total number of eggs.  
Give your answer in its simplest form.

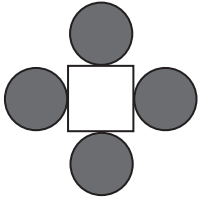
$12 : 120$  ←  $2 \times 6 = 12$  eggs in two boxes.  $20 \times 6 = 120$  eggs in total. Writing this as the ratio

Simplifying the ratio by dividing both sides by 12. It cannot go any simpler as 1 and 10 cannot be divided by the same amount to get smaller whole numbers →  $1 : 10$

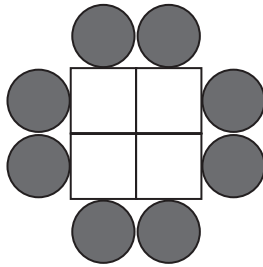
(Total for Question 10 is 2 marks)

11 A sequence of patterns is made from circular tiles  and square tiles 

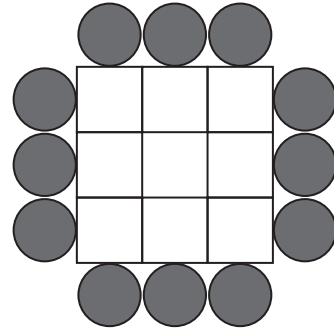
Here are the first three patterns in the sequence.



pattern number 1



pattern number 2



pattern number 3

(a) How many square tiles are needed to make pattern number 6?

$6 \times 6$  ← Pattern number 6 will form a 6 by 6 square made of square tiles

36

(2)

(b) How many circular tiles are needed to make pattern number 20?

$20 \times 4$  ← The circular tiles go up in 4s starting with 4. This is the 4 times table

80

(2)

Derek says,

“When the pattern number is odd, an odd number of square tiles is needed to make the pattern.”

(c) Is Derek right?

You must give reasons for your answer.

Yes, odd  $\times$  odd = odd

Multiplying the pattern number by itself will give the number of square tiles

(2)

(Total for Question 11 is 6 marks)

12 There are only 7 blue pens, 4 green pens and 6 red pens in a box.

One pen is taken at random from the box.

Write down the probability that this pen is blue.

7 + 4 + 6

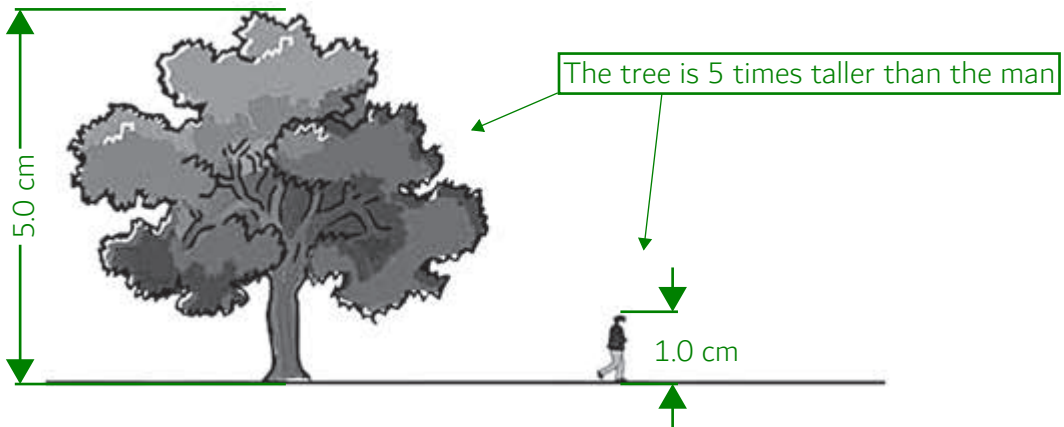
This works out that the total number of pens is 17

7 out of the 17 pens are blue

7/17

(Total for Question 12 is 2 marks)

13 The diagram shows a tree and a man.



The man is of average height.

The tree and the man are drawn to the same scale.

(a) Write down an estimate for the real height, in metres, of the man.

A doorway is about 2 metres. A man is a bit shorter than this

..... 1.8 ..... metres  
(1)

(b) Find an estimate for the real height, in metres, of the tree.

$$\begin{array}{r}
 1.8 \\
 \times 5 \\
 \hline
 9.0 \\
 4
 \end{array}$$

..... 9 ..... metres  
(2)

(Total for Question 13 is 3 marks)

14 Year 9 students from Halle School were asked to choose one language to study.

The table shows information about their choices.

Language	Number of students	
French	56	
Spanish	40	
German	24	

120

There are 120 students in total

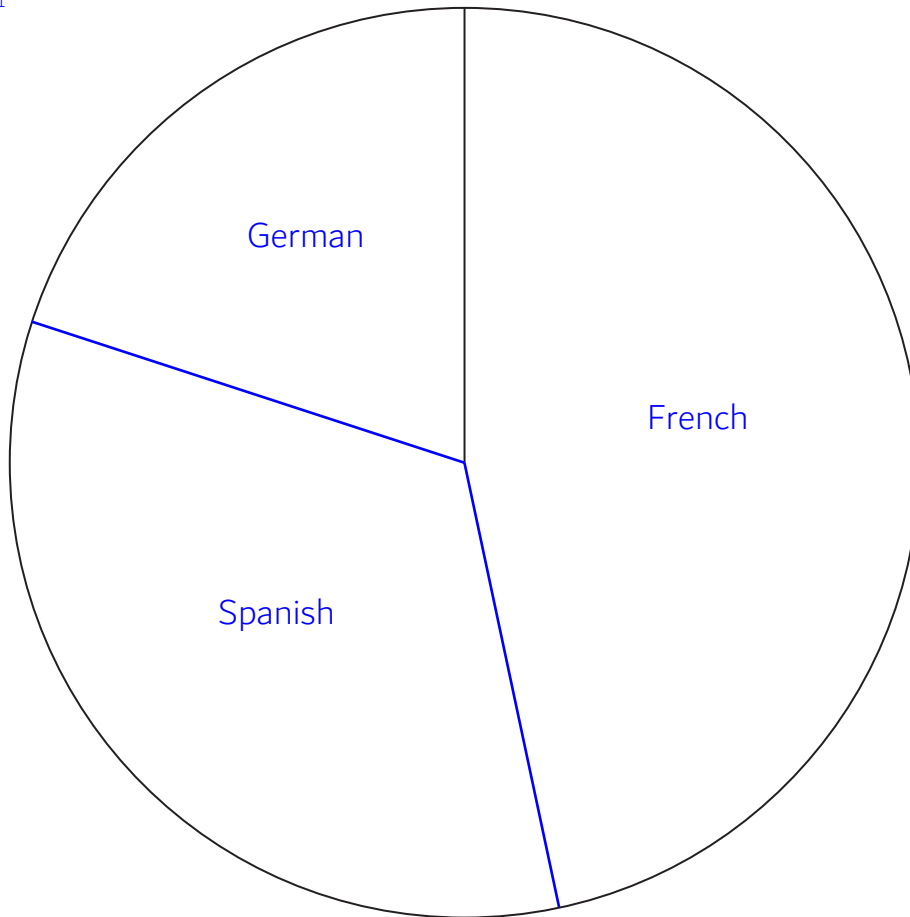
(a) Draw an accurate pie chart to show this information.

$$\frac{360}{120} = \frac{36}{12} = 3$$

There are 360° in total in a pie chart. Dividing these 360° by the 120 students works out that there are 3° for each student

$$\begin{array}{r} 56 \\ \times 3 \\ \hline 168 \end{array} \quad \begin{array}{r} 40 \\ \times 3 \\ \hline 120 \end{array} \quad \begin{array}{r} 24 \\ \times 3 \\ \hline 72 \end{array}$$

Multiplying each of the numbers of students by 3 works out the angle representing each language

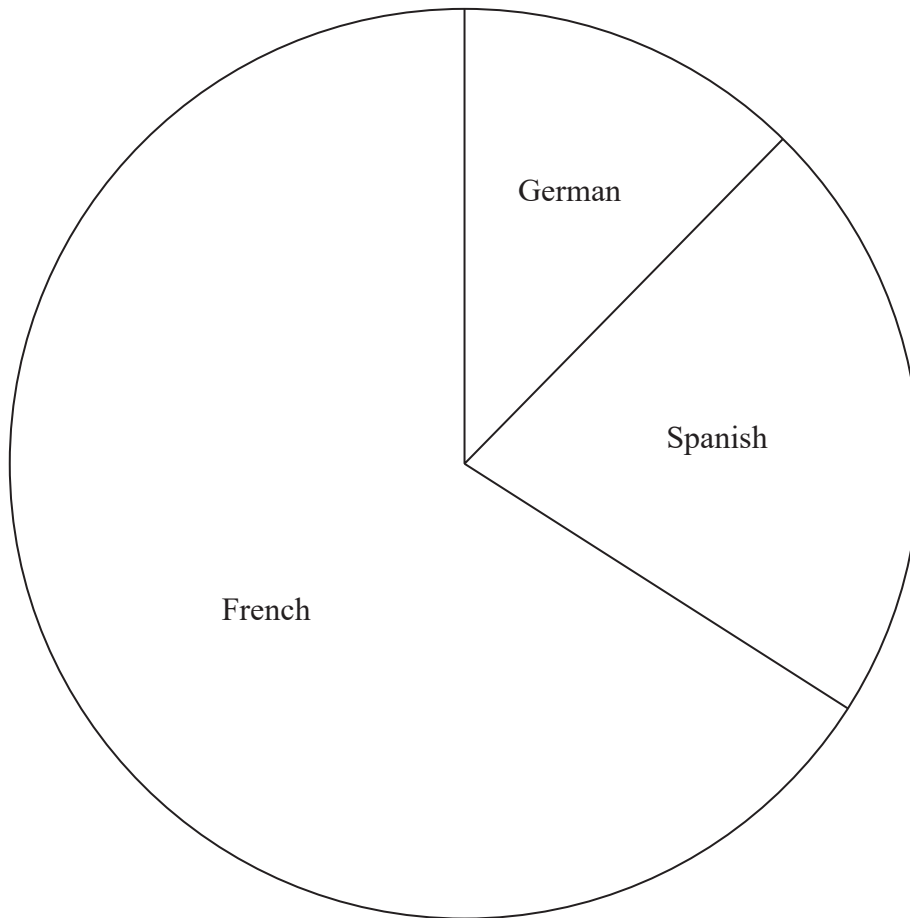


Drawing on the angles using a protractor then labelling each sector

(3)

Year 9 students from Lowry School were also asked to choose one language to study.

This accurate pie chart shows information about their choices.



Shameena says,

“The pie chart shows that French was chosen by more Year 9 students at Lowry School than at Halle School.”

- (b) Is Shameena right?  
You must explain your answer.

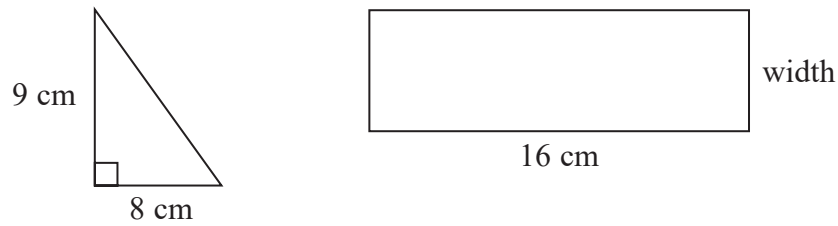
No, the number of students choosing French is not given

The pie chart shows proportion but not the actual amounts

(1)

(Total for Question 14 is 4 marks)

15 Here are a triangle and a rectangle.



The area of the rectangle is 6 times the area of the triangle.

Work out the width of the rectangle.

$$8 \div 2 \leftarrow \text{Area of triangle} = 1/2 \times \text{base} \times \text{height. Dividing the 8 cm by 2 works out that half the base is 4 cm}$$

$$4 \times 9 \leftarrow \text{Multiplying half the base by the height works out that the area of the triangle is } 36 \text{ cm}^2$$

$$\begin{array}{r} 36 \\ \times 6 \\ \hline 216 \\ 3 \end{array} \leftarrow \text{The area of the rectangle is 6 times the area of the triangle, so is } 216 \text{ cm}^2$$

$$16 \overline{) 213.50} \leftarrow \text{Area of rectangle} = \text{length} \times \text{width. So dividing the area of the rectangle by the length works out that the width is } 13.5 \text{ cm}$$

$$\begin{array}{r} 32 \\ 48 \\ 64 \\ 80 \end{array} \leftarrow \text{Listing the 16 times table helps with the division}$$

$$\begin{array}{r} 64 \\ 80 \end{array}$$

$$\dots\dots\dots 13.5 \dots\dots\dots \text{ cm}$$

(Total for Question 15 is 4 marks)

16  $v = u + at$

$$u = 1 \quad a = -3 \quad t = \frac{1}{2}$$

Work out the value of  $v$ .

$$2 \overline{) 3.0} \leftarrow \text{This works out that } at \text{ is worth } -1.5. \\ -3 \times 1/2 = -3 \div 2$$

$$1 - 1.5 \leftarrow v = 1 - 1.5$$

$$v = \dots\dots\dots -0.5 \dots\dots\dots$$

(Total for Question 16 is 2 marks)

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17 5 tins of soup have a total weight of 1750 grams.  
 4 tins of soup and 3 packets of soup have a total weight of 1490 grams.

Work out the total weight of 3 tins of soup and 2 packets of soup.

$$5 \overline{) 1750} \leftarrow \text{Dividing the 1750 grams by the 5 tins works out that 1 tin weighs 350 grams}$$

$$\begin{array}{r} 350 \\ \times 4 \\ \hline 1400 \end{array} \leftarrow \text{Multiplying the weight of 1 tin by 4 works out that 4 tins weigh 1400 grams}$$

$$\begin{array}{r} 1490 \\ -1400 \\ \hline 90 \end{array} \leftarrow \text{Subtracting the weight of 4 tins from the 1490 grams works out that 3 packets weigh 90 grams}$$

$$3 \overline{) 90} \times 2 = 60 \leftarrow \text{Dividing the weight of 3 packets by 3 works out that 1 packet weighs 30 grams. Then multiplying this by 2 works out that 2 packets weigh 60 grams}$$

$$\begin{array}{r} 350 \\ \times 3 \\ \hline 1050 \end{array} \leftarrow \text{Multiplying the weight of 1 tin by 3 works out that 3 tins weigh 1050 grams}$$

$$\begin{array}{r} 1050 \\ + 60 \\ \hline 1110 \end{array} \leftarrow \text{Adding the weight of the 2 packets to the weight of 3 tins works out the total weight of 3 tins and 2 packets}$$

..... 1110 ..... grams

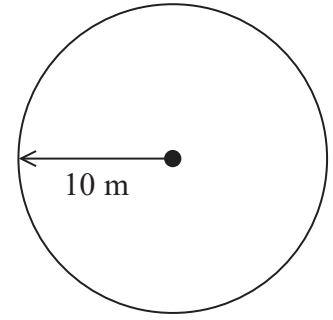
(Total for Question 17 is 4 marks)

- 18 Balena has a garden in the shape of a circle of radius 10 m.  
He is going to cover the garden with grass seed to make a lawn.

Grass seed is sold in boxes.

Each box of grass seed will cover 46 m<sup>2</sup> of garden.

Balena wants to cover all the garden with grass seed.



- (a) Work out an estimate for the number of boxes of grass seed Balena needs.  
You must show your working.

$3 \times 10^2$  ← Area of circle =  $\pi \times \text{radius}^2$ .  $\pi$  can be rounded to 3. So the area of the garden is about 300 m<sup>2</sup>

$300 \div 50$  ← The 46 m<sup>2</sup> can be rounded to 50 m<sup>2</sup>. Dividing the area of the garden by this works out an estimate of how many boxes are needed

$300 \div 50 = 30 \div 5 = 6$  → 6  
(4)

- (b) Is your estimate for part (a) an underestimate or an overestimate?  
Give a reason for your answer.

Underestimate as  $\pi$  was rounded down and the area covered by each box was rounded up

Rounding  $\pi$  down means that the area calculated is less than the actual area. Dividing by a greater area covered by each box gives less boxes

(1)

(Total for Question 18 is 5 marks)

19 (a) Solve  $4(x - 5) = 18$

$4x - 20 = 18$  ← Expanding the brackets on the left

$4x = 38$  ← Adding 20 to both sides eliminates the -20 on the left and gets the x term on its own

Dividing both sides by 4 gets x on its own. 38 cannot be divided by 4 to get a whole number so the answer can be left as a fraction

$x = \frac{38}{4}$   
(2)

$-3 < t \leq 2$   
 $t$  is an integer.

(b) Write down all the possible values of  $t$ .

$t$  is greater than -3 but is less than or equal to 2

$-2, -1, 0, 1, 2$   
(2)

(Total for Question 19 is 4 marks)

20 Azmol is paid £1500 per month.

He is going to get a 3% increase in the amount of money he is paid.

Work out how much money Azmol will be paid per month after the increase.

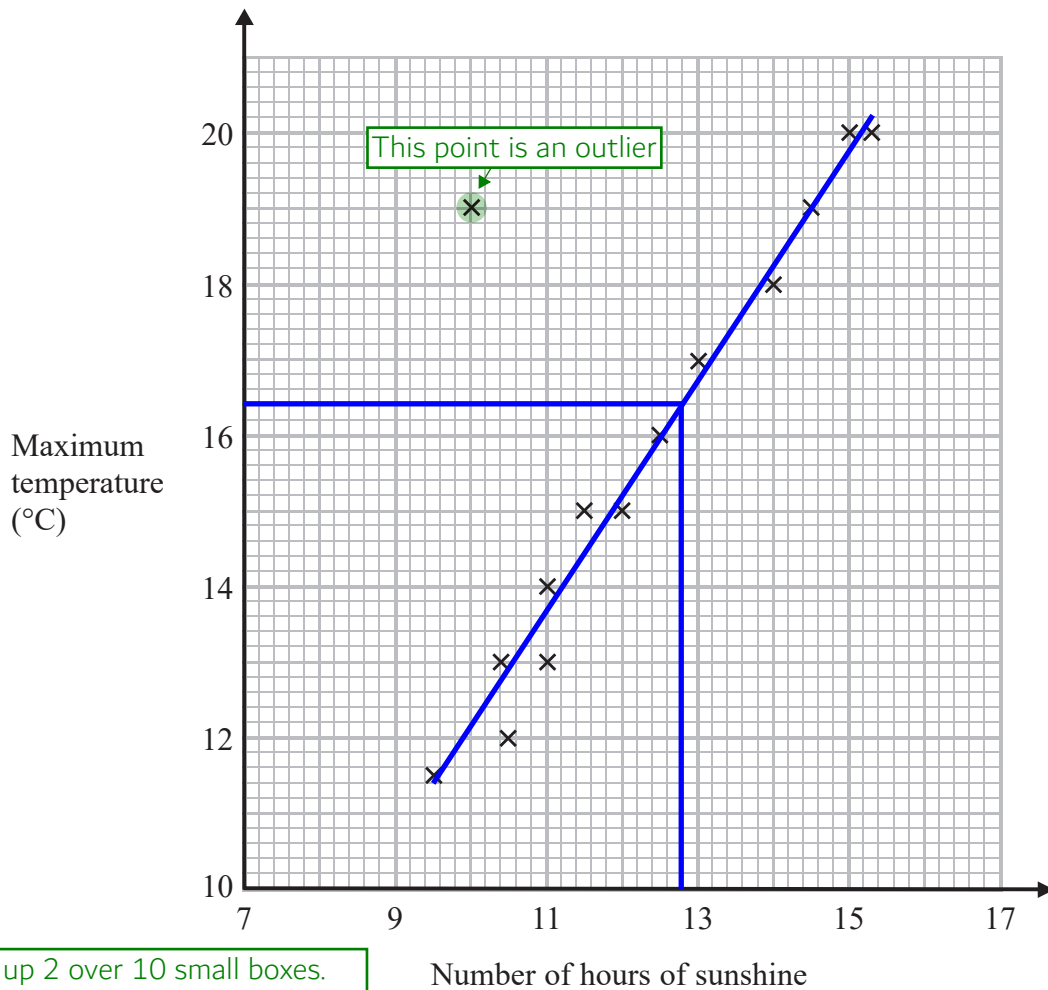
$\frac{15}{45}$  ← 1% of £1500 is  $£1500 \div 100 = £15$ . Then multiplying this by 3 works out that 3% of £1500 is £45

$\frac{1500}{+ 45}$  ← Adding the value of 3% to the £1500 works out how much money Azmol will be paid per month after the increase

£ 1545

(Total for Question 20 is 2 marks)

- 21 The scatter graph shows the maximum temperature and the number of hours of sunshine in fourteen British towns on one day.



Both scales go up 2 over 10 small boxes.  
 $2 \div 10 = 0.2$ , so each small box is worth 0.2

One of the points is an outlier.

- (a) Write down the coordinates of this point.

x-coordinate y-coordinate  
 ( 10 , 19 )  
 (1)

- (b) For all the other points write down the type of correlation.

Positive

(1)

As one variable (number of hours of sunshine) increases, so does the other variable (maximum temperature). This is positive correlation

On the same day, in another British town, the maximum temperature was  $16.4^{\circ}\text{C}$ .

(c) Estimate the number of hours of sunshine in this town on this day.

Drawing a line of best fit. Reading across from  $16.4^{\circ}\text{C}$  to the line then down to the number of hours of sunshine

.....12.8..... hours  
(2)

A weatherman says,

“Temperatures are higher on days when there is more sunshine.”

(d) Does the scatter graph support what the weatherman says?

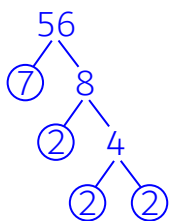
Give a reason for your answer.

Yes, as there is positive correlation

(1)

(Total for Question 21 is 5 marks)

22 Express 56 as the product of its prime factors.



Doing a factor tree. Splitting each number into two factors and stopping at the primes, which are circled

Writing the circled primes multiplied together →  $2 \times 2 \times 2 \times 7$

(Total for Question 22 is 2 marks)

23 Work out  $54.6 \times 4.3$

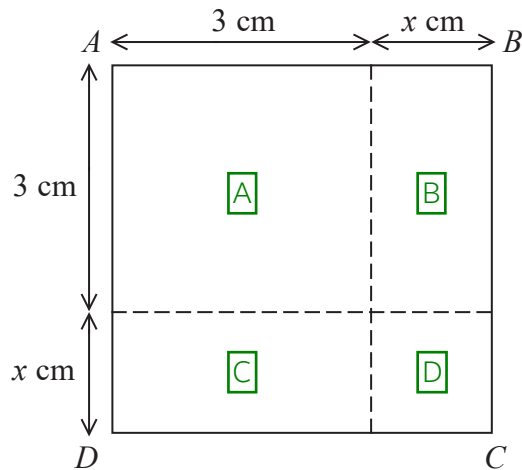
$$\begin{array}{r} 546 \\ \times 43 \\ \hline 1638 \\ \phantom{1}1 \\ 21840 \\ \phantom{1}2 \\ \hline 23478 \\ \phantom{1}1 \end{array}$$

← Ignoring the decimal points and doing  $546 \times 43$

There is 1 decimal place in 54.6. There is 1 decimal place in 4.3. There are 2 decimal places in total. So bringing the decimal point to the left 2 times

234.78

(Total for Question 23 is 3 marks)



The area of square  $ABCD$  is  $10\text{ cm}^2$ .

Show that  $x^2 + 6x = 1$

$$x^2 + 3x + 3x + 9$$

Area of rectangle = length  $\times$  width. So the area of rectangle D is  $x^2$ , the area of rectangle C is  $3x$ , the area of rectangle B is  $3x$  and the area of rectangle A is  $9$ . Adding all these areas expresses the area of square ABCD

$$x^2 + 6x + 9 = 10$$

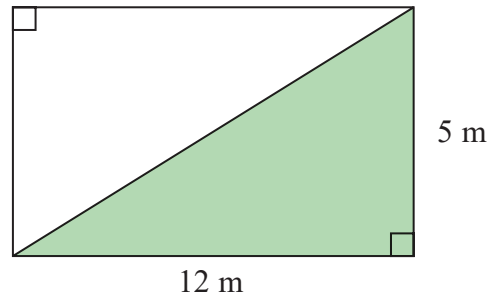
Simplifying the expression of the area of square ABCD. Setting equal to the value of the area,  $10$

$$x^2 + 6x = 1$$

Subtracting  $9$  from both sides

(Total for Question 24 is 3 marks)

25 This rectangular frame is made from 5 straight pieces of metal.



The weight of the metal is 1.5 kg per metre.

Work out the total weight of the metal in the frame.

$$12^2 + 5^2$$

Using Pythagoras' Theorem in the green right-angled triangle to find the missing length going through the middle of the rectangle.  $a^2 + b^2 = c^2$ , where  $a$  and  $b$  are the shorter sides and  $c$  is the longest side

$$\begin{array}{r} 144 \\ + 25 \\ \hline 169 \end{array}$$

$12^2 = 144$  and  $5^2 = 25$ . Then adding these works out that  $c^2$  is 169. 13 is squared to give 169 so the missing length is 13 m

$$12 + 12 + 5 + 5 + 13$$

Adding all five lengths of metal works out that the total length of metal used is 47 metres

$$\begin{array}{r} 47 \\ \times 15 \\ \hline 235 \\ 470 \\ \hline 705 \end{array}$$

Multiplying the 47 metres by the 1.5 kg per metre works out the total weight of the metal in the frame. Ignoring the decimal point and doing  $47 \times 15$

There was 1 decimal place in 1.5. So bringing the decimal point to the left 1 time

..... 70.5 ..... kg

(Total for Question 25 is 5 marks)

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26 The equation of the line  $L_1$  is  $y = 3x - 2$   
The equation of the line  $L_2$  is  $3y - 9x + 5 = 0$

Show that these two lines are parallel.

$$3y = 9x - 5$$

The general equation of a straight line is  $y = mx + c$ , where  $m$  is the gradient and  $c$  is the  $y$ -intercept. The equation of  $L_2$  needs to be rearranged into this form to work out the gradient. First adding  $9x$  to both sides and subtracting  $5$  from both sides to get the  $y$  term on its own

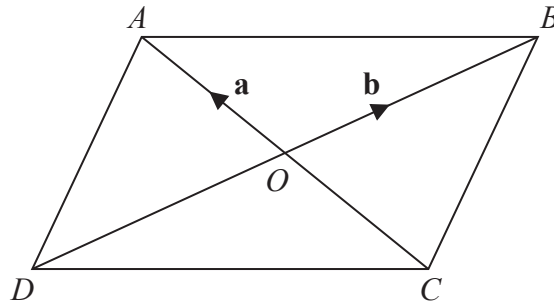
$$y = 3x - \frac{5}{3}$$

Dividing both sides by  $3$  gets  $y$  on its own and puts it into the form  $y = mx + c$ .  $m$  is  $3$  so the gradient is  $3$

The gradient of both lines is  $3$

Parallel lines have the same gradient

(Total for Question 26 is 2 marks)



$ABCD$  is a parallelogram.

The diagonals of the parallelogram intersect at  $O$ .

$$\vec{OA} = \mathbf{a} \text{ and } \vec{OB} = \mathbf{b}$$

- (a) Find, in terms of  $\mathbf{b}$ , the vector  $\vec{DB}$ .

$\vec{DO}$  is also  $\mathbf{b}$  as it is the same length and direction as  $\vec{OB}$ .  $\vec{DB} = \vec{DO} + \vec{OB} = \mathbf{b} + \mathbf{b}$ .

$$2\mathbf{b}$$

(1)

- (b) Find, in terms of  $\mathbf{a}$  and  $\mathbf{b}$ , the vector  $\vec{AB}$ .

$\vec{AO}$  is  $-\vec{OA}$  as it is going in the opposite direction, so is  $-\mathbf{a}$ .  $\vec{AB} = \vec{AO} + \vec{OB}$

$$-\mathbf{a} + \mathbf{b}$$

(1)

- (c) Find, in terms of  $\mathbf{a}$  and  $\mathbf{b}$ , the vector  $\vec{AD}$ .

$\vec{AO}$  is  $-\vec{OA}$  as it is going in the opposite direction, so is  $-\mathbf{a}$ .  $\vec{OD}$  is  $-\vec{DO}$  as it is going in the opposite direction, so is  $-\mathbf{b}$ .  $\vec{AD} = \vec{AO} + \vec{OD}$

$$-\mathbf{a} - \mathbf{b}$$

(1)

(Total for Question 27 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS