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

Centre Number

Candidate Number

Mathematics

Paper 1 (Non-Calculator)

Foundation Tier

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

Paper Reference
1MA1/1F

Total Marks

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

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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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 indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

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

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

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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 x 2 x 2 x 2
Keep Doubling:
2, 4, 8, 16

16

(Total for Question 1 is 1 mark)

2 Write 7.264 51 correct to 3 decimal places.

The 5 in the 4th decimal place means that the 3rd rounds up.

7.265

(Total for Question 2 is 1 mark)

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

The multiplication can be done in any order. 7 x 8 first.

56ef

(1)

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

$x = 2\frac{1}{2} \times 5$

2 x 5 = 10
1/2 x 5 = 2.5
10 + 2.5

$x =$ 12.5

(1)

(Total for Question 3 is 2 marks)

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

1/10 = 10%
1/5 = 20%
4/5 = 1/5 x 4
20% x 4

80 %

(Total for Question 4 is 1 mark)
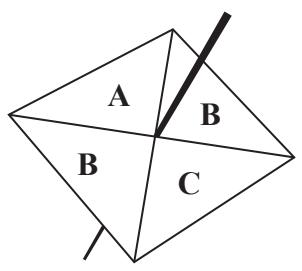
.CG Maths.

5 Work out 60% of 70

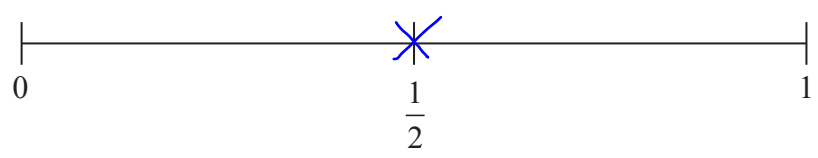10% is 7
7 × 6

60% = 10% x 6

42

(Total for Question 5 is 2 marks)

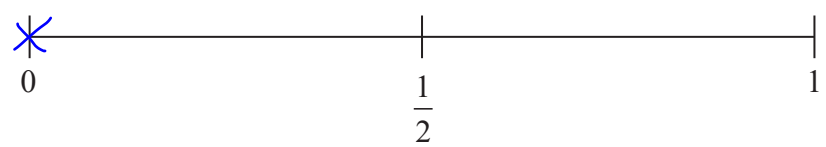**6** Sammy spins a fair 4-sided spinner.

A
B
B
C

There are 2 Bs out of 4 possible outcomes. This gives a probability of 2/4, which simplifies to 1/2. There is no F so this is impossible.

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

0          $\frac{1}{2}$ 1

(1)

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

0          $\frac{1}{2}$ 1

(1)

(Total for Question 6 is 2 marks)

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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.

$2 \times £1.50 = £3$

$£3 + £1.60 = £4.60$

$£10 - 30p = £9.70$

$\begin{array}{r} 9.70 \\ -4.60 \\ \hline 5.10 \end{array}$

$\begin{array}{r} 1.70 \\ 3\overline{)5.^{2}10} \end{array}$

No

The cost of 2 packets of bread rolls.

Total cost for the bread and ketchup.

Total cost by taking away the change.

Total cost of 3 packs of sausages.

Cost of 1 pack of sausages.

The cost is £1.70, not £2.30

(Total for Question 7 is 3 marks)

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

Multiply the numerators and denominators together and combine into one fraction.

$\dfrac{15}{32}$

(1)

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

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

$\dfrac{5}{12}$

(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.

$8 \times 12 = 96$
$1\frac{1}{4} \times 12 \times 2 = 30$
$96 + 30$

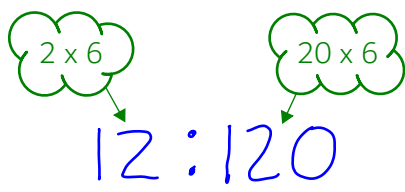10 hours worked means 2 hours must have been overtime and 8 were on his normal rate.

£ ....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.

2 x 6   20 x 6

$12 : 120$

Divide both sides of the ratio by 12 as this is a common factor.

Can't be simplified any further as the only common factor is 1.

$1 : 10$

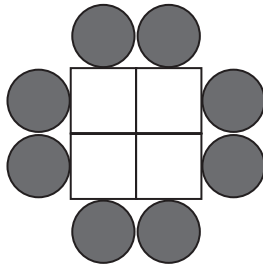**(Total for Question 10 is 2 marks)**

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11 A sequence of patterns is made from circular tiles ⬤ and square tiles ☐
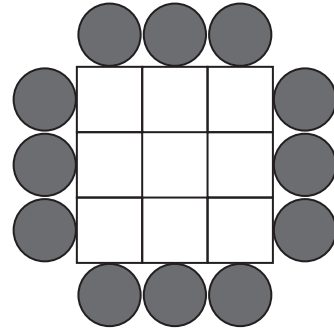
Here are the first three patterns in the sequence.
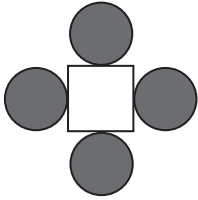
pattern number 1   pattern number 2   pattern number 3

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

6^2

> The square tiles form a larger square so the number of square tiles are going to be square numbers.

....36

(2)

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

20×4

> The number of circular tiles follows the pattern 4, 8, 12... 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.

> The pattern number is squared to get the number of square tiles so the odd pattern number will be multiplied by itself.

Yes, as odd × odd = odd

(2)

(Total for Question 11 is 6 marks)

.CG Maths.

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

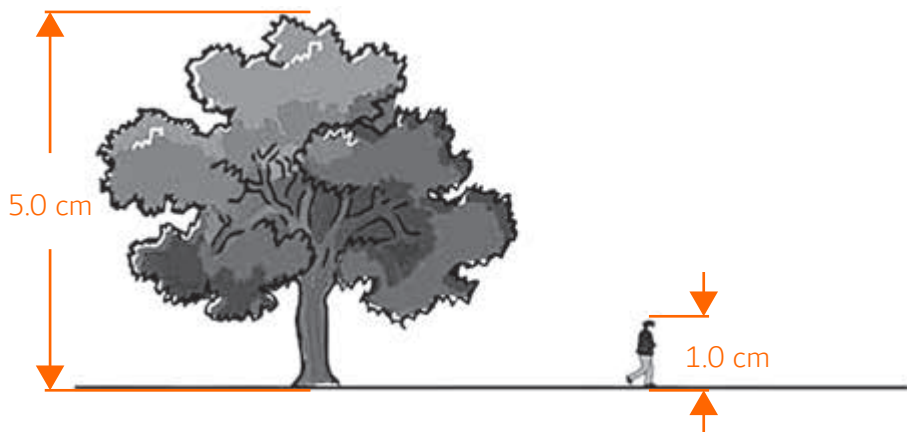One pen is taken at random from the box.

Write down the probability that this pen is blue.

There are 17 in total. 7 out of the 17 are blue.

$$\frac{7}{17}$$

(Total for Question 12 is 2 marks)

13 The diagram shows a tree and a man.

5.0 cm

1.0 cm

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.

.............1.8............. metres

(1)

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

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

They are drawn to the same scale and the tree is about 5 times greater in height.

..............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	degrees
French	56	168
Spanish	40	120
German	24	72

120

120 students in total.

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

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

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

If there are 3 degrees per student, multiplying by 3 works out the angle needed for each sector.

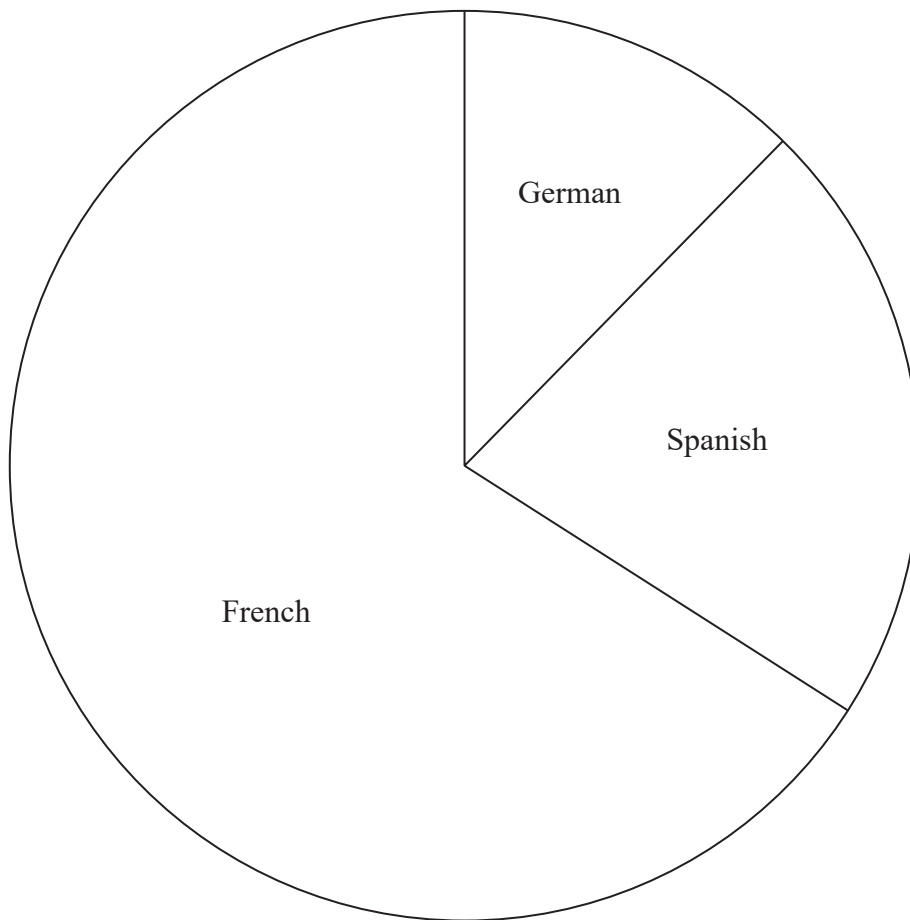*360 degrees in total. Dividing by 120 tells us there is 3 degrees per student.*
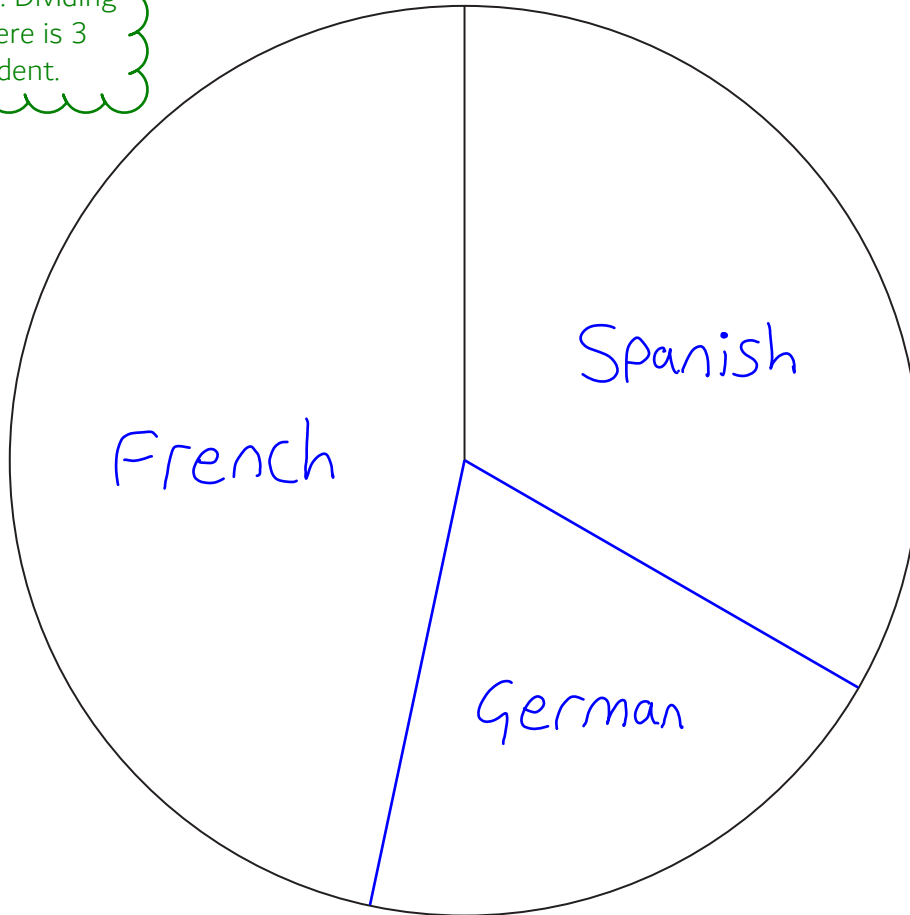
Spanish

French

German

(3)

.CG Maths.

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

This accurate pie chart shows information about their choices.

German

Spanish

French

Shameena says,

"The pie chart shows that French was chosen by more Year 9 students at Lowry School than at Halle School."
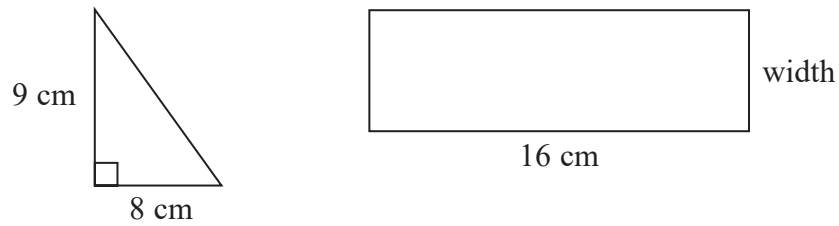
(b) Is Shameena right?
You must explain your answer.

NO, as we are not given the totals, only the proportions

(1)

(Total for Question 14 is 4 marks)

15 Here are a triangle and a rectangle.

width

16 cm

9 cm

8 cm

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

Work out the width of the rectangle.

> Area of rectangle = length x width
> Width = area of rectangle/length
> Area of rectangle = 6 x area of triangle
> Area of triangle = 1/2 x base x height

$\frac{1}{2} \times 8 \times 9 = 36$

$\begin{array}{r} 36 \\ \times\ 6 \\ \hline 21\ 6 \\ {}_3 \end{array}$

$\begin{array}{r} 13.5 \\ 16\overline{)216.{}^5{}8 0} \end{array}$

13.5 .... cm

(Total for Question 15 is 4 marks)

16 $v = u + at$

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

Work out the value of v.

> Substituting the values into the equation.

$1 + -3 \times \frac{1}{2}$

$1 - \frac{3}{2}$

$v =$ .... $-\frac{1}{2}$ ....

(Total for Question 16 is 2 marks)

.CG Maths.

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.

$$\begin{array}{r} 350 \\ 5\overline{)17^250} \end{array}$$

The weight of 1 tin.

$$\begin{array}{r} 350 \\ \times \quad 4 \\ \hline 14\,00 \end{array}$$

The weight of 4 tins.

$$\begin{array}{r} 1490 \\ -1400 \\ \hline 90 \end{array}$$

The weight of 3 packets.

$$\begin{array}{r} 30 \\ 3\overline{)90} \end{array}$$

The weight of 1 packet.

$$\begin{array}{r} 350 \\ \times \quad 3 \\ \hline 1050 \end{array} \qquad \begin{array}{r} 30 \\ \times \ 2 \\ \hline 60 \end{array}$$

The weight of 3 tins and 2 packets

$$\begin{array}{r} 1050 \\ + \quad 60 \\ \hline 11,10 \end{array}$$
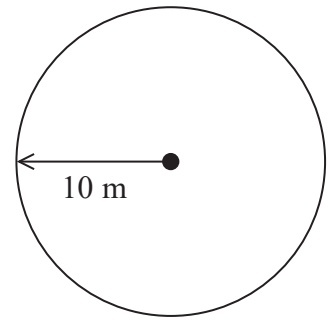
The total weight of 3 tins and 2 packets

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

(Total for Question 17 is 4 marks)

.CG Maths.

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^2 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.

$$\pi \times 10^2 \approx 3 \times 100 = 300$$

Area of circle = πr^2
π is about 3.14 and is rounded to 1 significant figure.

$$\frac{300}{50}$$

The area covered by each box is rounded to 1 significant figure, so rounds to 50. Working out how many lots of 50 go into the area of 300.

6

(4)

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

Underestimate as π was rounded down and the area covered by each box was rounded up

Rounding π down means the area calculated would be less than the real area. Dividing by a greater area covered by each box gives less boxes

(1)

(Total for Question 18 is 5 marks)

.CG Maths.

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

$4x - 20 = 18$ ← Expanding the bracket

$4x = 38$ ← Adding 20 to both sides

Dividing both sides by 4

$x = \dfrac{38}{4}$

(2)

$-3 < t \leqslant 2$
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.
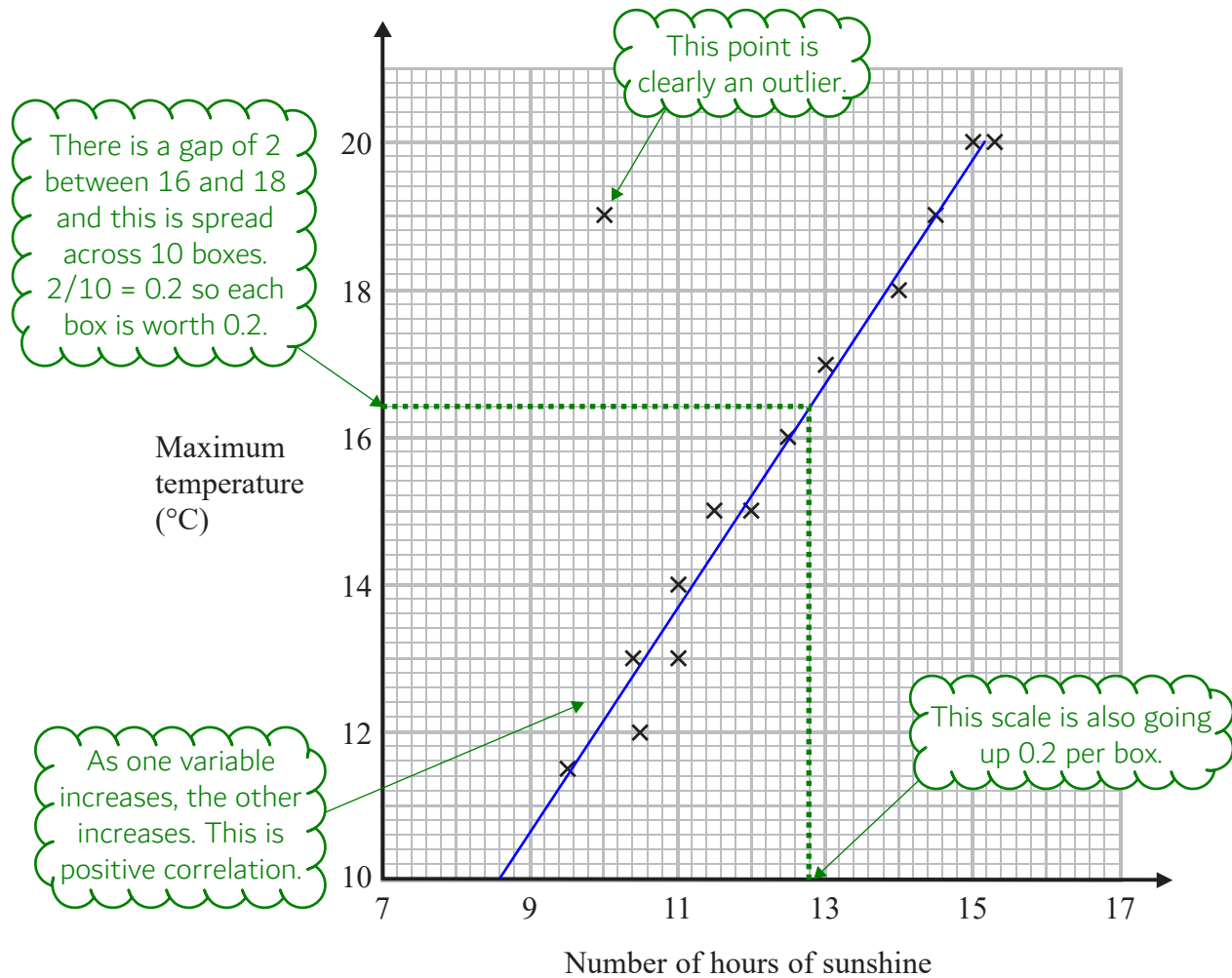He is going to get a 3% increase in the amount of money he is paid.

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

$1\% = £15$
$3\% = 15 \times 3 = £45$
£1500 + £45

£ 1545

(Total for Question 20 is 2 marks)

.CG Maths.

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

> This point is clearly an outlier.

> There is a gap of 2 between 16 and 18 and this is spread across 10 boxes. 2/10 = 0.2 so each box is worth 0.2.

> As one variable increases, the other increases. This is positive correlation.

> This scale is also going up 0.2 per box.

Maximum temperature (°C)

Number of hours of sunshine

One of the points is an outlier.

(a) Write down the coordinates of this point.

(10 , 19)

(1)

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

Positive

(1)

https://youtu.be/Iep4WjALdBA

.CG Maths.

On the same day, in another British town, the maximum temperature was 16.4 °C.

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

12.8 .... hours

(2)

A weatherman says,

"Temperatures are higher on days when there is more sunshine."

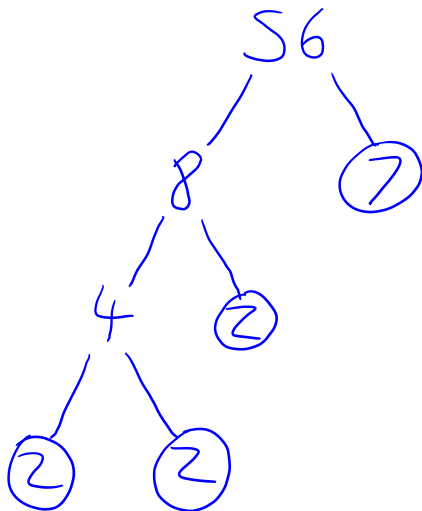(d) Does the scatter graph support what the weatherman says?
Give a reason for your answer.

Yes, as there is positive correlation.

(1)

(Total for Question 21 is 5 marks)

22 Express 56 as the product of its prime factors.

56
8   7
4   2
2   2

56 = 8 x 7
7 is prime.
8 = 4 x 2
2 is prime.
4 = 2 x 2
2 is prime.

Check: 2^3 x 7 = 8 x 7 = 56

$2^3 \times 7$

(Total for Question 22 is 2 marks)

https://youtu.be/txucZDTT6mU

23 Work out 54.6×4.3

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

234.78

(Total for Question 23 is 3 marks)

https://youtu.be/7ickKjCNoro

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24

3 cm x cm

A ←———— 3 cm ————→←— x cm —→ B

3 cm

3 x 3   3 x x

x cm

3 x x x x x

D C
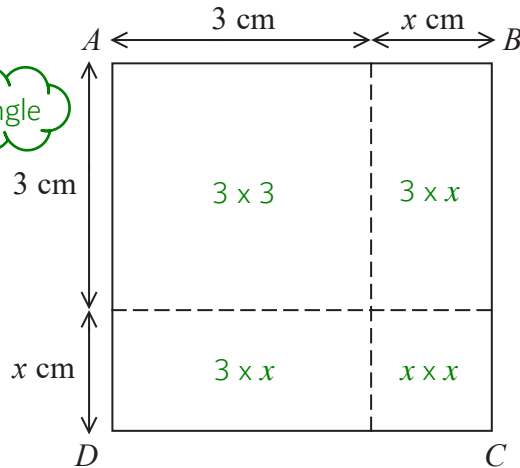
The area of square $ABCD$ is 10 cm².

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

Adding up all the individual areas gives the total area of 10
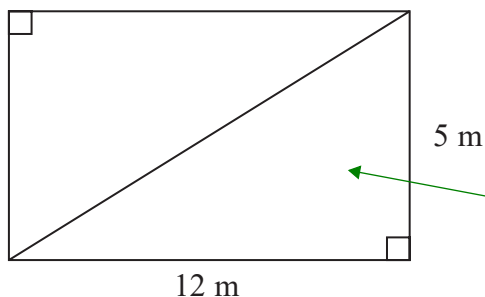
$$3^2 + 3x + 3x + x^2 = 10$$

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

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

Simplifying gets us closer to the desired result.

(Total for Question 24 is 3 marks)

https://youtu.be/2y9d5R7F1Bw

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

5 m

12 m

> This is a right-angled triangle so Pythagoras finds the missing side.
> $a^2 + b^2 = c^2$
> $c = \sqrt{a^2 + b^2}$

The weight of the metal is 1.5 kg per metre.

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

$1.5 \times (12 + 5 + 12 + 5 + \sqrt{12^2 + 5^2})$

$1.5 \times (34 + \sqrt{169})$

1.5×47

> Adding together all the lengths and multiplying it by the weight per metre gives the total weight.

70.5 .... kg

(Total for Question 25 is 5 marks)

.CG Maths.

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

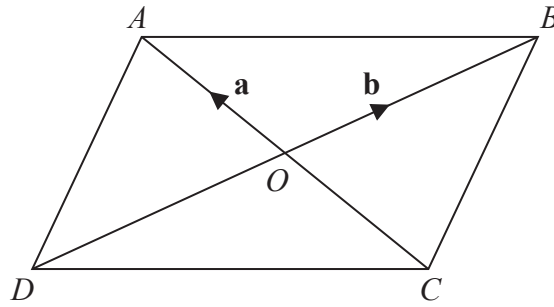Show that these two lines are parallel.

$$3y = 9x - 5$$

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

y = mx + c is the general equation for a straight line.
m is the gradient so L_1 must have a gradient of 3.
Rearranging the second equation can put it into the
desired form and we can work out the gradient.

Both lines have a gradient of 3
∴ they are parallel

(Total for Question 26 is 2 marks)

https://youtu.be/VQEGJpsbVzw

27

$ABCD$ is a parallelogram.
The diagonals of the parallelogram intersect at O.

$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$

(a) Find, in terms of **b**, the vector $\overrightarrow{DB}$.

$\overrightarrow{DO} = \overrightarrow{OB}$

$2b$

(1)

(b) Find, in terms of **a** and **b**, the vector $\overrightarrow{AB}$.

From A to B, we go against **a**, making it negative, and with **b** meaning it is positive.

$b - a$

(1)

(c) Find, in terms of **a** and **b**, the vector $\overrightarrow{AD}$.

From A to D, we go against **a** and **b**, making them negative. $\overrightarrow{OD} = -b$

$-a - b$

(1)

(Total for Question 27 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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