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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

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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P 4 8 1 3 4 A 0 1 2 0

Pearson

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

$2^4 = 2 \times 2 \times 2 \times 2$

16

(Total for Question 1 is 1 mark)

2 Write 7.264 51 correct to 3 decimal places.

↳ 5 or more : round up

7.265

(Total for Question 2 is 1 mark)

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

$= 7 \times 8 \times e \times f$

$= 56ef$

56ef

(1)

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

↑ change to improper fraction

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

$x =$ 25/2

(1)

cross multiply $\frac{x}{5} = \frac{5}{2}$ $2x = 25$ $x = \frac{25}{2}$

(Total for Question 3 is 2 marks)

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

$\frac{4^{\times 2}}{5_{\times 2}} = \frac{8}{10} = 0.8$

$0.8 \times 100 = 80\%$.

80 %

(Total for Question 4 is 1 mark)

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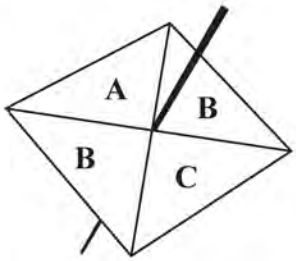
5 Work out 60% of 70

$\frac{60}{100} \times 70 = 42$

42

(Total for Question 5 is 2 marks)

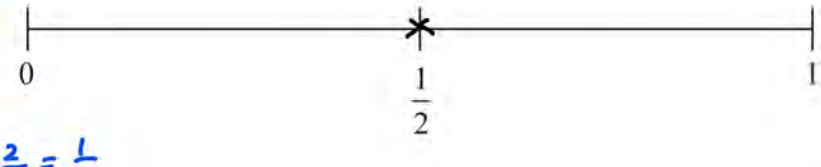
6 Sammy spins a fair 4-sided spinner.



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

× 2 outcomes out of the possible (4) are 'B'.

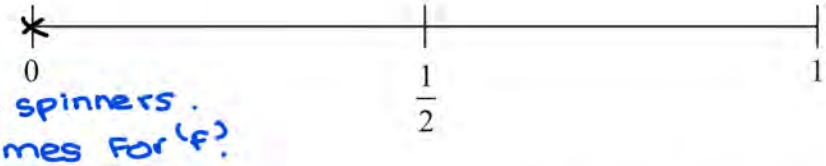
$\therefore P(B) = \frac{2}{4} = \frac{1}{2}$



(1)

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

× No 'F' on spinners.
∴ No outcomes for 'F'.



(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.

$2 \times £1.5 + 1 \times £1.6 + 3 \times £x = £10 - £0.3$

cost of (2) bread rolls; cost for (1) ketchup bottle; cost for (3) sausage Packets; Total cost for the goods.

$£3 + £1.6 + 3 \times £x = £9.7$

$3 \times £x = £9.7 - (£3 + £1.6)$

$£x = \frac{£9.7 - £4.6}{3}$

$x = \frac{5.1}{3}$

$= £1.7$ ∴ Fathima is incorrect as $£1.7 \neq £2.3$

(Total for Question 7 is 3 marks)

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

$\frac{5 \times 3}{8 \times 4} = \frac{15}{32}$

$\frac{15}{32}$

(1)

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

$\frac{2 \times 4}{3 \times 4} - \frac{1 \times 3}{4 \times 3}$ Make the denominator same by making each to their LCM = 12.

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

$\frac{8-3}{12} = \frac{5}{12}$

$\frac{5}{12}$

(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.

Hours overtime : 10 − 8 = 2 hrs

Normal pay for Monday: 8 × £12 = £96

Overtime pay = £12 × $1\frac{1}{4}$ ← change to improper.

= £12 × $\frac{5}{4}$

= £15

Total Pay : £96 + £15×2 = £96 + £30 = £126

(£15×2: overtime pay for Monday.)

£ 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.

Two boxes : Total boxes

6×2 : 6×20

12 : 120

1 : 10

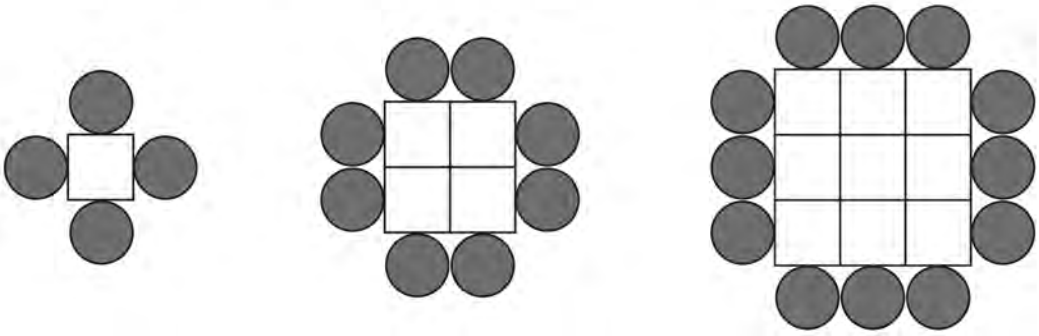
(6×2: number of eggs per box (6) times the no. of boxes.)

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?

1, 4, 9, ... Create a sequence for the number of square tiles.

n^{th} term is n^2.

Pattern 6 : $(6)^2 = 36$ tiles

36 tiles

(2)

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

4, 8, 12 create a sequence for the number of circular tiles

+4 +4

n^{th} term is $4n$.

Pattern 20: $4(20) = 80$

80 tiles.

(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.

odd number examples: $(5)^2 = 25$, $(9)^2 = 81$, $(7)^2 = 49$, $(21)^2 = 441$ } all odd squares are odd.

n^{th} term of square tiles is n^2. If n is odd; $(odd)^2$

$\therefore$ odd x odd = odd. Therefore, Derek is correct.

(2)

(Total for Question 11 is 6 marks)

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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.

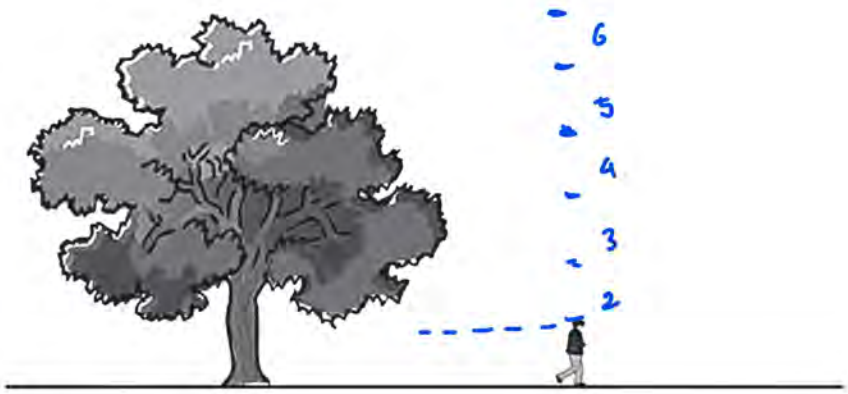
Write down the probability that this pen is blue.

Total pens in the box → $\frac{7}{7+4+6} = \frac{7}{17}$

$\frac{7}{17}$

(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.

The average heights of men are between 1.5 and 1.7. Estimated to 2 significant figures.

1.6 metres

(1)

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

scale ← $= 6 \times 1.6$ ← height of man

$= 9.6$

9.6 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	Angle
French	56	168
Spanish	40	120
German	24	72
		360

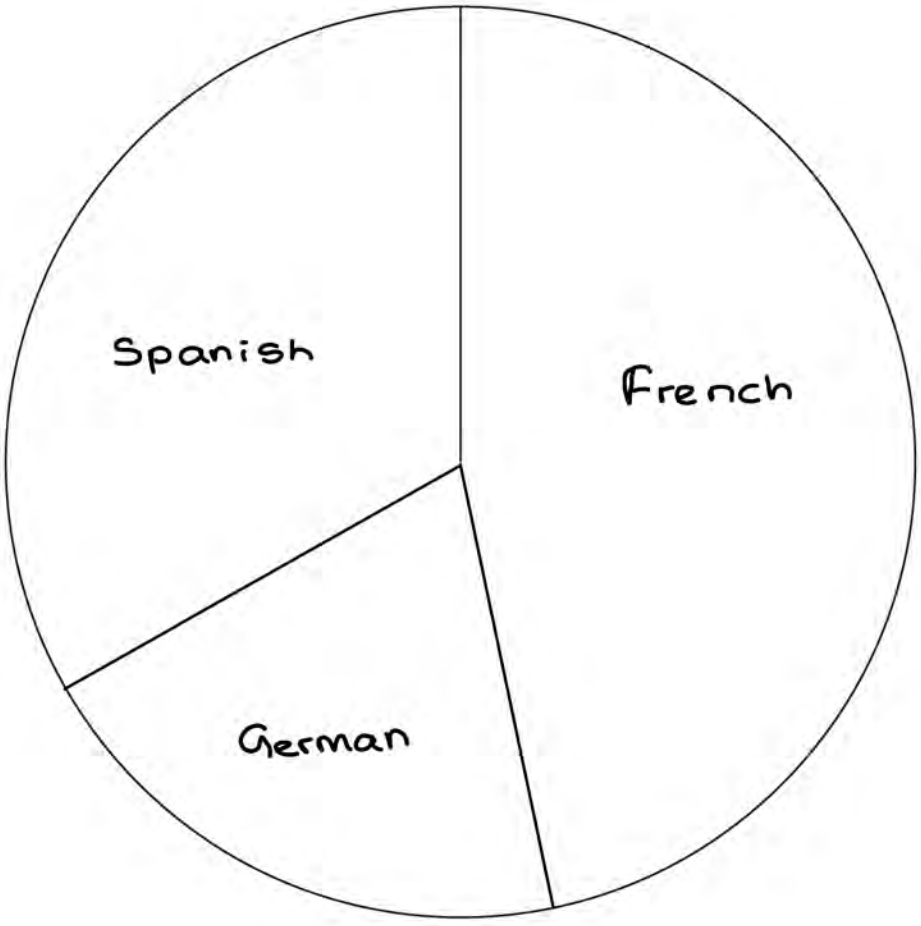
Total 56+40+24=120

$\frac{56}{120} \times 360 = 168$

$\frac{40}{120} \times 360 = 120$

$\frac{24}{120} \times 360 = 72$

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



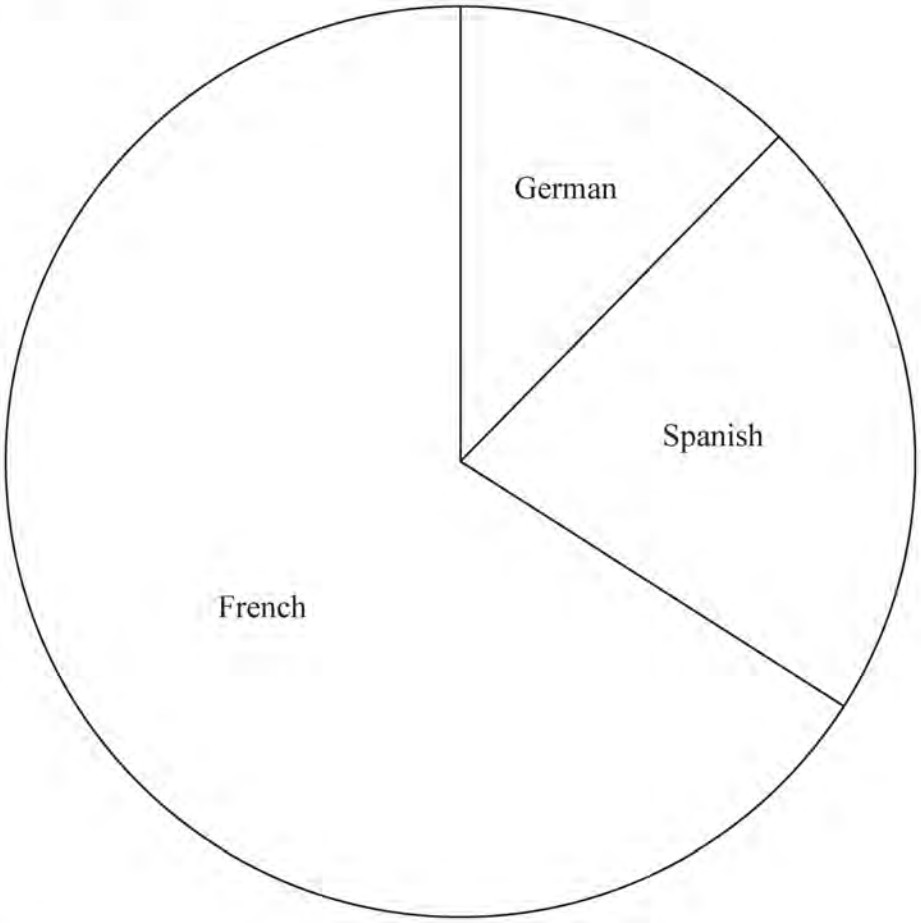
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Year 9 students from Lowry School were also asked to choose one language to study.

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."

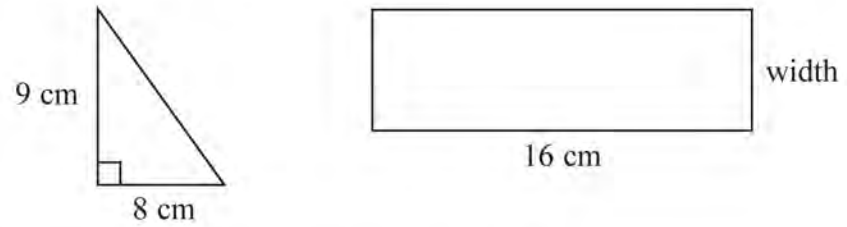
(b) Is Shameena right?
You must explain your answer.

No as the total number of students in year 9 at Lowry School is not known.

(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.

Area of $\triangle$ A $= \frac{1}{2} \times$ base $\times$ height

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

$\therefore$ Area of $\square$ Should be $36 \times 6\ cm^3 = 216 cm^3$

Area of $\square$ = height x width

$216 = 16 \times$ width

$\text{width} = \frac{216 \div 8}{16 \div 8} = \frac{27}{2}$

$\frac{27}{2}$ 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.

$V = (1) + (-3)(\frac{1}{2})$ Substitute values to eqn

$= 1 + (-\frac{3}{2})$

$= 1 - \frac{3}{2} = 1 - 1.5$ changing to decimals may help.

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

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

(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.

tin = 't' packets = 'p'

$5t = 1750$ — (1) $\quad 4t + 3p = 1490$ — (2)

$\div 5 \quad \div 5$

(1) $\div 5 \quad t = 350$ — (3)

Sub (3) to (2) $\quad 4(350) + 3p = 1490$

$3p = 1490 - 1400$

$\frac{3p}{3} = \frac{90}{3}$

$p = 30$

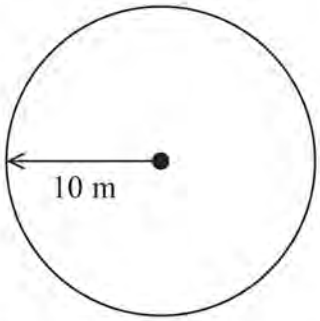
Total weight of 3t and 2p $= 3t + 2p$

$= 3(350) + 2(30) = 1050 + 60 = 1110$

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^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.

Area of garden $= \pi r^2$

$= \pi (10)^2 = 100\pi \ m^2$

$\approx 100 \times 3$ $\quad \pi = 3$ to 1 s.f.

$\approx 300 m^2$

No. of boxes $= \frac{300}{50} = 6$ $\quad 46 \approx 50$ to 1 s.f.

All numbers estimated to 1 s.f.

6 boxes

(4)

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

Underestimate. The area of garden is an underestimate because π was rounded down to 3.

The area covered by the box was rounded up and was an overestimate.

As $\frac{\text{lower numerator}}{\text{higher denominator}}$ = lower value.

(1)

(Total for Question 18 is 5 marks)

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

$4x - (4)(5) = 18$

$+20 \quad 4x - 20 = 18 \quad +20$

$4x = 18 + 20 \quad \div 4$

$\div 4 \quad x = \frac{38}{4} \overset{\div 2}{=} \frac{19}{2}$

Simplify

$x =$ $\frac{19}{2}$

(2)

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

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

An integer is a whole number.
$t \neq -3$ because t is greater than -3.

$-2, -1, 0, 1, 2$

(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.

$\text{Increase} = \frac{3}{100} \times 1500 = £45$

$\text{Total after increase} = £1500 + £45$
$= £1545$

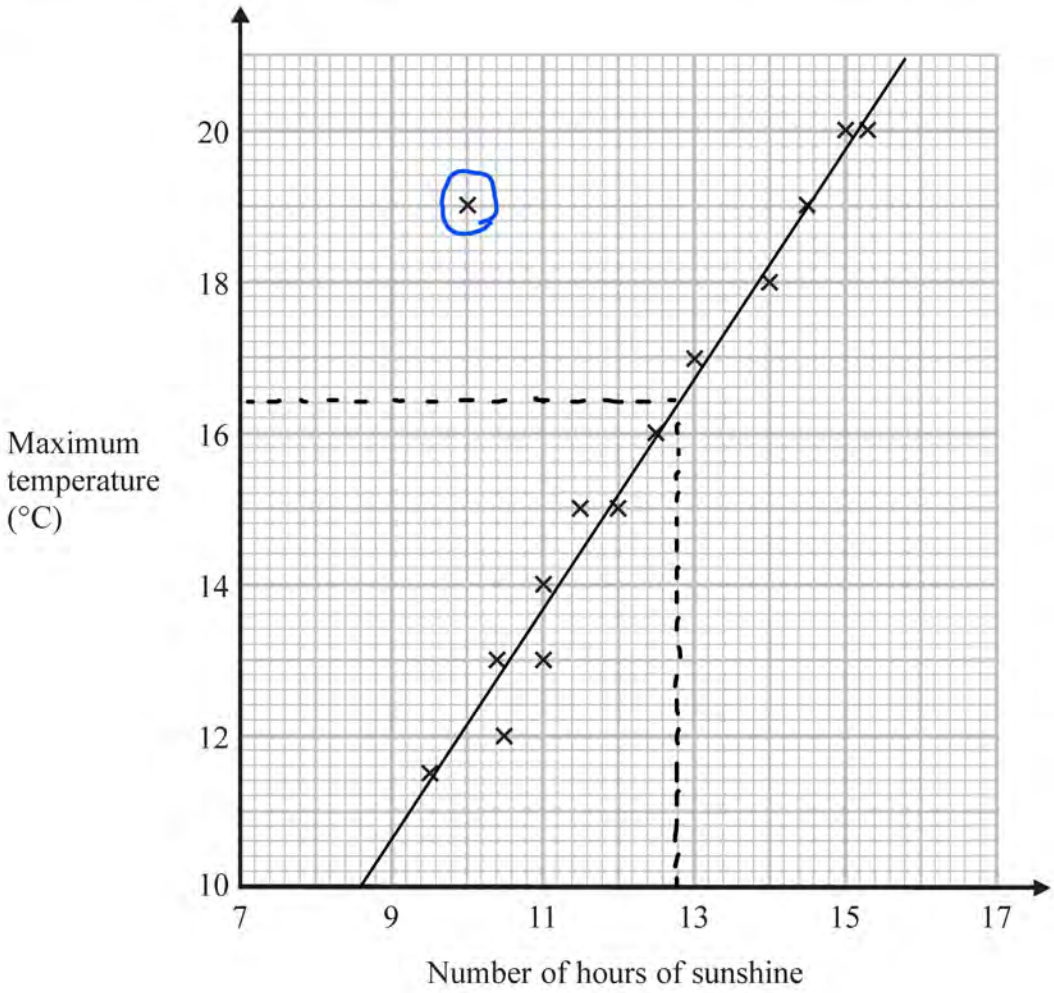
£ 1545

(Total for Question 20 is 2 marks)

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



One of the points is an outlier.

(a) Write down the coordinates of this point.

An outlier does not follow the trend of the data.

(10 , 19)

(1)

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

positive.

(1)

positive - as x increases, y increases.

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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 the number of hours of sunshine increases, the maximum temperature increases.

(1)

(Total for Question 21 is 5 marks)

22 Express 56 as the product of its prime factors.



$56 = 2 \times 2 \times 2 \times 7$
$= 2^3 \times 7$

$2^3 \times 7$

(Total for Question 22 is 2 marks)

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23 Work out 54.6×4.3

Using grid method

x	50	4	0.6
4	200	16	2.4
0.3	15	1.2	0.18

Sum all no.s in the grid:

$200 + 15 + 16 + 1.2 + 2.4 + 0.18 = 234.78$

234.78

(Total for Question 23 is 3 marks)

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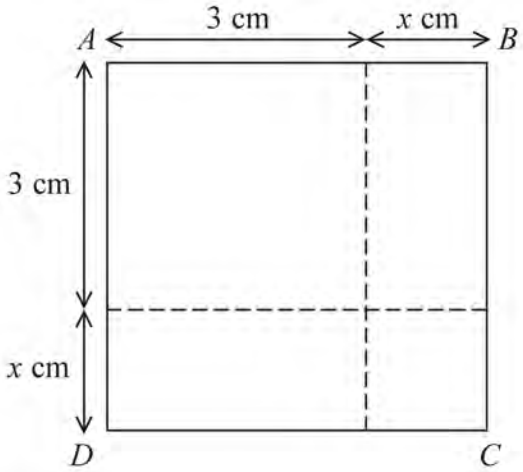
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24



The area of square $ABCD$ is 10 cm^2.

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

Area of Square = (length of side)^2

$= (3+x)^2$

$= (3+x)(3+x)$ Expand brackets

$= 9+3x+3x+x^2$ Collect like terms

$= x^2+6x+9$

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

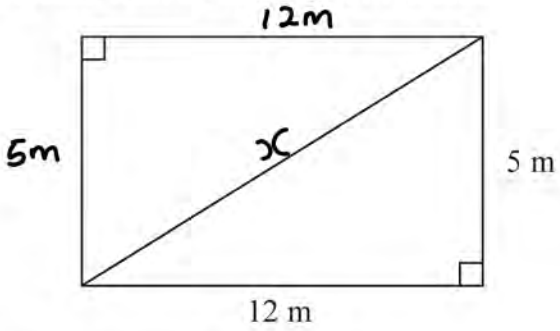
$-9 \qquad -9$

$1 = x^2+6x$

$x^2+6x=1$

(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.

$x^2 = 5^2 + 12^2$

$x = \sqrt{25+144}$

$= \sqrt{169} = 13\text{ m}$

Total length $= 12 + 5 + 12 + 5 + 13$

$= 47\text{ m}$

Total weight $= 47 \times 1.5$

$= 70.5\text{ kg}$

70.5 kg

(Total for Question 25 is 5 marks)

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26 The equation of the line L_1 is $y = 3x - 2$ (1)
The equation of the line L_2 is $3y - 9x + 5 = 0$ (2)

Show that these two lines are parallel.

Subject y in (2)

$3y - 9x + 5 = 0$

$+9x \quad +9x$

$3y + 5 = 9x$

$-5 \quad -5$

$3y = 9x - 5$

$\div 3 \quad \div 3$

$y = \frac{9}{3}x - \frac{5}{3}$

$y = 3x - 5/3$

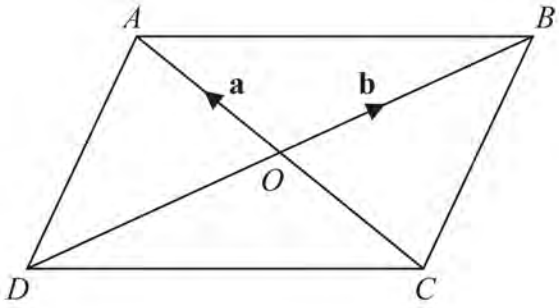
$y = mx + c$ (m = gradient)

m of (2) is 3 and m of (1) is 3.

∴ They are parallel.

(Total for Question 26 is 2 marks)

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 $\overrightarrow{DB}$.

$\overrightarrow{DB} = 2\overrightarrow{OB}$

$2\underline{b}$

(1)

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

$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$
$= -\underline{a} + \underline{b}$

$\underline{b} - \underline{a}$

(1)

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

$\overrightarrow{AD} = \overrightarrow{AB} + \overrightarrow{BD}$
$= [\underline{b} - \underline{a}] + [-2\underline{b}]$
$= \underline{b} - \underline{a} - 2\underline{b}$

$-\underline{b} - \underline{a}$

(1)

(Total for Question 27 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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