

Please check the examination details below before entering your candidate information

Candidate surname

Other names

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

Centre Number

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Candidate Number

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Time 1 hour 30 minutes

**Paper
reference**

1MA1/3F

Mathematics
PAPER 3 (Calculator)
Foundation Tier

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator, Formulae Sheet (enclosed). 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 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.



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.
- Try to answer every question.
- Check your answers if you have time at the end.
- Good luck with your examination.

Turn over ►

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Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write 35% as a fraction. *Divide by 100*

$$\frac{35}{100} \text{ (1)}$$

$$\frac{35}{100}$$

(Total for Question 1 is 1 mark)

2 Work out $\frac{1}{4}$ of 28

$$\frac{1}{4} \times 28 = 7 \text{ (1)}$$

$$7$$

(Total for Question 2 is 1 mark)

3 Write down two factors of 12

Any 2 from 1, 2, 3, 4, 6 and 12

$$1 \times 12$$

$$2 \times 6$$

$$3 \times 4$$

$$3$$

$$4$$

$$\text{(1)}$$

(Total for Question 3 is 1 mark)

4 Simplify $2m \times 3$

$$2m \times 3 = 6m \text{ (1)}$$

$$6m$$

(Total for Question 4 is 1 mark)

5 Find $\sqrt{1.69}$

$$\sqrt{169} = 13$$

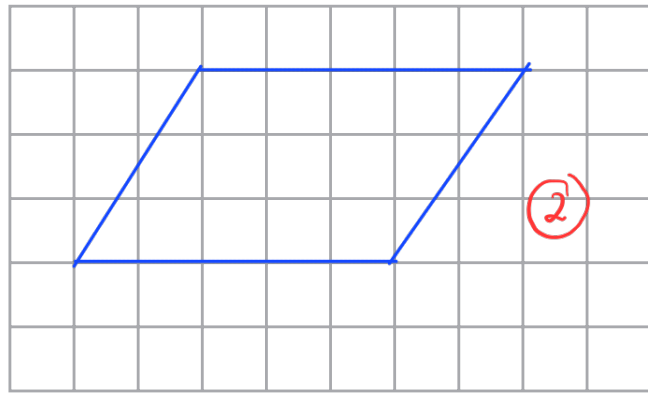
$$\sqrt{1.69} = 1.3$$

$$1.3$$

$$\text{(1)}$$

(Total for Question 5 is 1 mark)

6



Parallelogram

On the grid, draw a quadrilateral with
no lines of symmetry
and rotational symmetry of order 2

(Total for Question 6 is 2 marks)

7 The table shows the total number of apples sold and the total number of oranges sold in a shop in each of three weeks.

	Week 1	Week 2	Week 3
Number of apples	86	75	92
Number of oranges	68	80	76

In total for the three weeks, more apples than oranges were sold.
How many more?

$$\text{Apple sales} : 86 + 75 + 92 = 253$$

$$\text{Orange sales} : 68 + 80 + 76 = 224 \quad (1)$$

Difference between apples and oranges sold :

$$253 - 224 = 29 \quad (1)$$

29 (1)

(Total for Question 7 is 3 marks)

8 Here are the first five terms of a number sequence.

3 8 13 18 23 28 33
+5 +5 +5 +5 +5 +5

(a) Write down the next two terms of this sequence.

28 33 (1)

(1)

Jim says that 50 is a term in this sequence.
Jim is wrong.

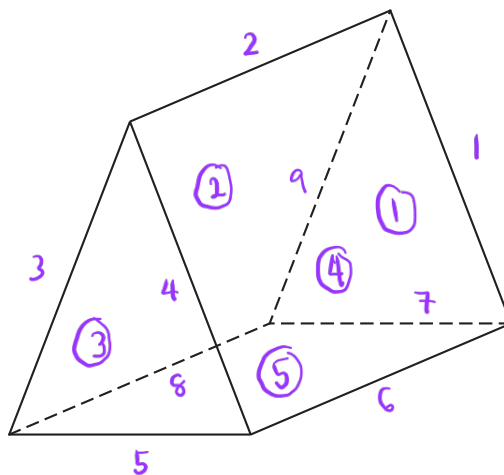
(b) Explain why.

Every term ends either in 3 or 8. (1)

(1)

(Total for Question 8 is 2 marks)

9 The diagram shows a solid triangular prism.



(a) Write down the number of faces of the prism.

5 (1)

(1)

(b) Write down the number of edges of the prism.

9 (1)

(1)

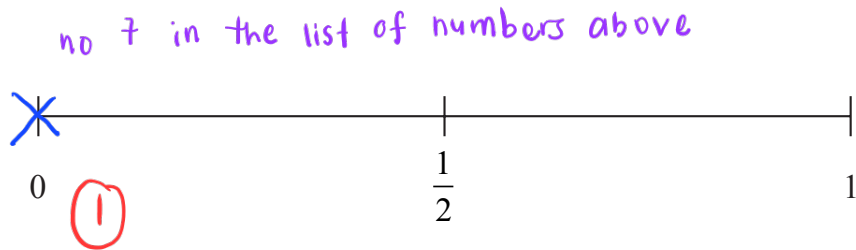
(Total for Question 9 is 2 marks)

10 Here is a list of 8 numbers.

2 2 3 5 6 6 8 9

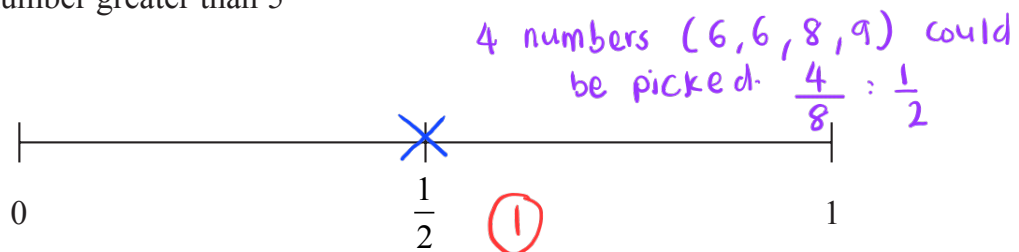
Kim picks at random one of these numbers.

(a) On the probability scale below, mark with a cross (×) the probability that Kim picks a number 7



(1)

(b) On the probability scale below, mark with a cross (×) the probability that Kim picks a number greater than 5



(1)

(c) Find the probability that Kim picks an even number.

Even number = 2, 2, 6, 6, 8 $\left(\frac{5}{8}\right)$
= (5 numbers) (1)

$\frac{5}{8}$ (1)

(2)

(Total for Question 10 is 4 marks)

- 11 Sinita wants to make 35 picture frames.
She needs 4 nails for each frame.

Sinita has 3 boxes of nails.
There are 48 nails in each box.

Has Sinita got enough nails to make all 35 frames?
Show how you get your answer.

Nails needed for all 35 frames :

$$35 \times 4 = 140 \quad (1)$$

Nails that Sinita has :

$$48 \times 3 = 144 \quad (1)$$

Yes, Sinita has enough nails since $144 > 140$. (1)

(Total for Question 11 is 3 marks)

- 12 Write 60 metres as a fraction of 1000 metres.
Give your answer in its simplest form.

$$\frac{60}{1000} = \frac{3}{50}$$

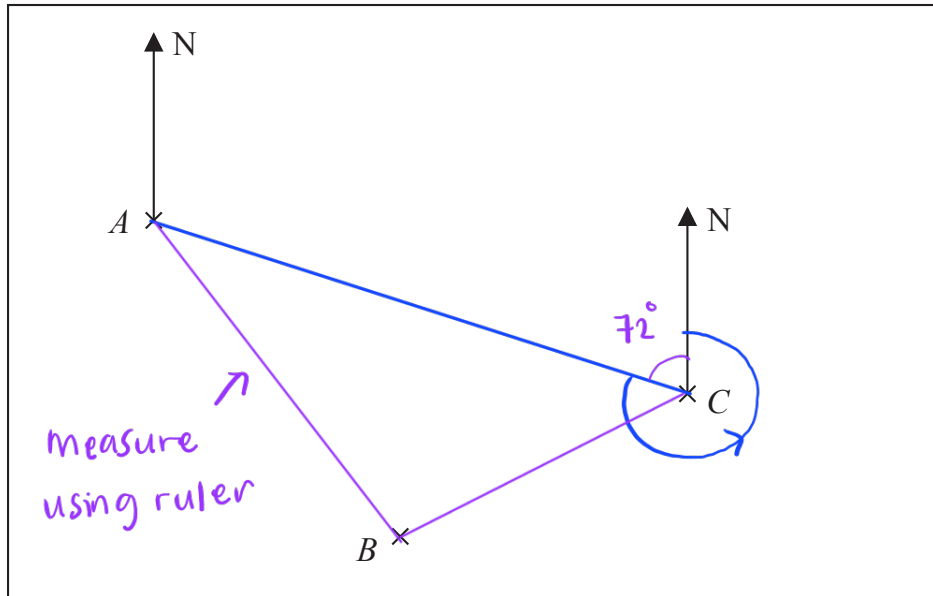
(1) $\div 20$

20 is the highest common factor

$$\frac{3}{50} \quad (1)$$

(Total for Question 12 is 2 marks)

13 The accurately drawn map shows the positions of three points, A , B and C , in a field.



Scale: 1 cm represents 150 metres

Parveen walks in a straight line from A to B .
She then walks in a straight line from B to C .

Susan walks in a straight line from A to C .

Parveen walks more metres than Susan.

(a) How many more?

measure by ruler *1 cm = 150 m*

$$\begin{array}{l}
 A \text{ to } B = 5 \text{ cm} \times 150 = 750 \text{ m} \\
 B \text{ to } C = 4 \text{ cm} \times 150 = 600 \text{ m} \\
 A \text{ to } C = 7 \text{ cm} \times 150 = 1050 \text{ m} \quad (1)
 \end{array}$$

Parveen walks $750 \text{ m} + 600 \text{ m} = 1350 \text{ m}$

Susan walks 1050 m

Difference = $1350 \text{ m} - 1050 \text{ m} = 300 \text{ m}$ (1)

300 (1) metres

(3)

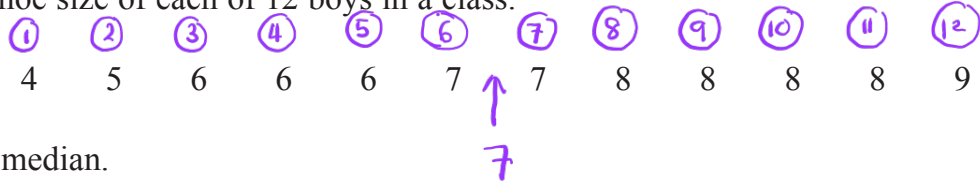
(b) Find by measurement the bearing of A from C .

angle for whole circle $\rightarrow 360^\circ - 72^\circ$
 $= 288^\circ$ (1)

288
 (1)

(Total for Question 13 is 4 marks)

14 Here is the shoe size of each of 12 boys in a class.



(a) Find the median.

median for even sets of number = mean of two middle values
in this case, 7 and 7.

7 (1)

(1)

(b) Work out the range.

$9 - 4 = 5$
Greatest value - smallest value

5 (1)

(1)

For the shoe sizes of each of 12 girls in the class,

the median size is 6
the range is 3

(c) Compare the distribution of the shoe sizes of the boys with the distribution of the shoe sizes of the girls.

The median shoe size of the boys is greater than girls. (7 to 6)

The range of the boys shoe size is bigger than girls. (5 to 3)

(2)

(2)

(Total for Question 14 is 4 marks)

15 Work out

$$\frac{2.75 \times 14.6}{10 - 1.97}$$

Tips: Multiply without decimal place.
Then, add back the total decimal places into final answer.

Numerator:

$$\begin{array}{r} 4 \\ 275 \\ \times 146 \\ \hline 1650 \\ 11000 \\ + 27500 \\ \hline 40150 \end{array}$$

$$40150 \div 1000 = 40.15 \quad (1)$$

Denominator:

$$10 - 1.97 = 8.03$$

$$\frac{40.15}{8.03} = 5 \quad (1)$$

5

(Total for Question 15 is 2 marks)

16 On the centimetre grid, draw an isosceles triangle with an area of 12 cm^2

Area of triangle:

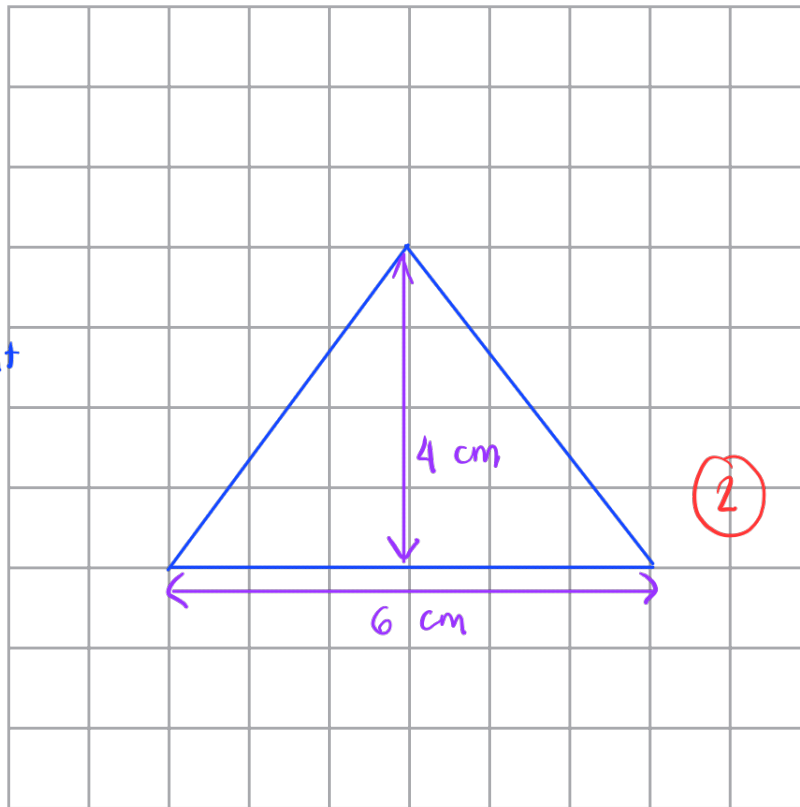
$$\frac{1}{2} \times \text{base} \times \text{height}$$

$$12 \text{ cm}^2 = \frac{1}{2} \times b \times h$$

$$b \times h = 24 \text{ cm}^2$$

can be $b = 6, h = 4$

or $b = 8, h = 3$



(Total for Question 16 is 2 marks)

17 (a) Expand $3(4 - 2x)$

$$\begin{array}{l} \text{multiply} \\ 3(4 - 2x) \end{array}$$

$$= 12 - 6x \quad (1)$$

$$12 - 6x$$

(1)

(b) Solve $\frac{3y}{4} = 12$

$$\frac{3y}{4} = 12 \quad \text{eliminate the denominator}$$

$$3y = 48 \quad (1)$$

$$y = 16 \quad (1)$$

$$y = \frac{16}{1} \quad (2)$$

(c) Factorise $4p + 6$

$$4p + 6 \quad \text{divide both terms by 2}$$

$$= 2(2p + 3) \quad (1)$$

$$2(2p + 3)$$

(1)

(Total for Question 17 is 4 marks)

18 (a) Write 2530 correct to 2 significant figures.

$$25\overset{\curvearrowleft}{\underset{-}{3}}0 \quad \text{2 significant figures}$$

3 < 5, so we round down

$$\begin{array}{r} 2500 \quad (1) \\ \hline \end{array}$$

(b) Write 0.0874 correct to 1 significant figure.

$$0.0\overset{\curvearrowleft}{\underset{-}{8}}74 \rightarrow 0.09 \quad \text{1 significant figure}$$

since 7 is > 5, round up to 0.09

$$\begin{array}{r} 0.09 \quad (1) \\ \hline \end{array}$$

(Total for Question 18 is 2 marks)

19 There are 400 counters in a box.
The counters are red or yellow or green.

$\frac{3}{8}$ of the counters are red.

82 of the counters are yellow.

What percentage of the counters are green?

Number of red counters

$$\frac{3}{8} \times 400 = 150 \quad (1)$$

↘ total counters

Number of green counters

$$\begin{aligned} & \text{Total} - \text{red} - \text{yellow} \\ & = 400 - 150 - 82 \\ & = 168 \quad (1) \end{aligned}$$

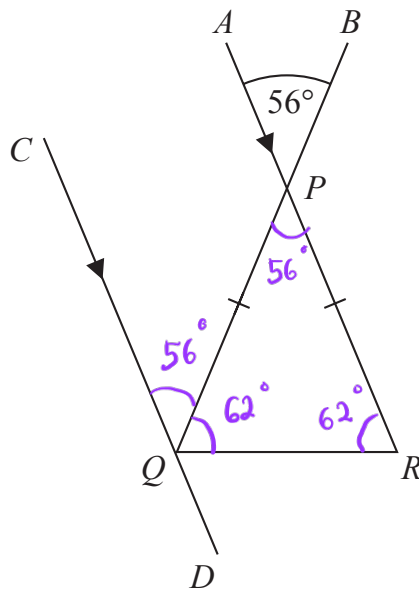
Percentage of green counters

$$\begin{aligned} & \frac{168}{400} \times 100\% \quad (1) \quad \frac{\text{Green counters}}{\text{Total counters}} \times 100 \\ & = 42\% \quad (1) \end{aligned}$$

42 %

(Total for Question 19 is 4 marks)

20 In the diagram, PQR is an isosceles triangle with $PQ = PR$.



APR and CQD are parallel lines.
 BPQ is a straight line.

Angle $APB = 56^\circ$

Work out the size of angle CQR .

Give a reason for each stage of your working.

$$\text{angle } QPR = \text{angle } APB = 56^\circ \text{ (because opposite angles are equal)} \quad (1)$$

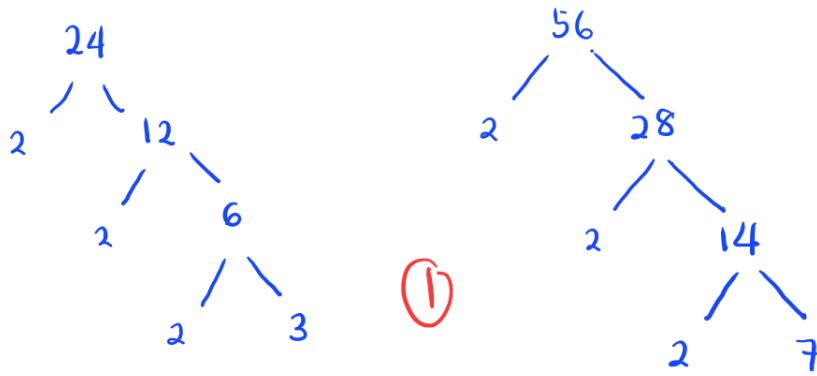
$$\begin{aligned} \text{angle } PQR = \text{angle } PRQ &= \frac{180^\circ - 56^\circ}{2} \\ &= 62^\circ \text{ (because angle at the base of an isosceles triangle are equal)} \quad (1) \end{aligned}$$

$$\text{angle } CQP = \text{angle } APB = 56^\circ \text{ (because corresponding angles are equal)} \quad (1)$$

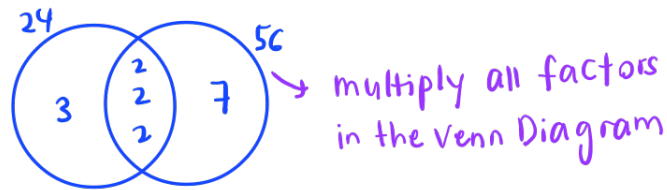
$$\begin{aligned} \text{angle } CQR &= \text{angle } CQP + \text{angle } PQR \\ &= 56^\circ + 62^\circ \\ &= 118^\circ \quad (1) \end{aligned}$$

(Total for Question 20 is 5 marks)

21 Work out the lowest common multiple (LCM) of 24 and 56



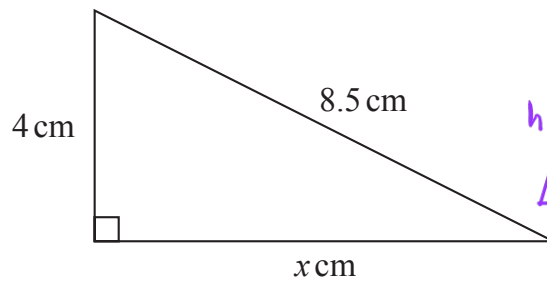
$$\begin{aligned} \text{LCM} &= 2 \times 2 \times 2 \times 3 \times 7 \\ &= 8 \times 3 \times 7 \\ &= 24 \times 7 \\ &= 168 \end{aligned}$$



$$168 \quad \textcircled{1}$$

(Total for Question 21 is 2 marks)

22 Here is a right-angled triangle.



Pythagoras theorem

$$a^2 + b^2 = h^2$$



Work out the value of x .

$$a^2 + b^2 = h^2$$

$$4^2 + x^2 = 8.5^2$$

$$x^2 = 8.5^2 - 4^2 \quad \textcircled{1}$$

$$= 72.25 - 16$$

$$x^2 = 56.25$$

$$x = \sqrt{56.25}$$

$$= 7.5 \quad \textcircled{1}$$

$$x = \dots\dots\dots 7.5$$

(Total for Question 22 is 2 marks)

23 $T = 4m^2 - 11$

(a) Work out the value of T when $m = -3$

$$\begin{aligned} T &= 4m^2 - 11 \\ &= 4(-3)^2 - 11 \quad \text{①} \quad \text{Substitute } m = -3 \\ &= 4(9) - 11 \\ &= 36 - 11 \\ &= 25 \quad \text{①} \end{aligned}$$

$$T = \frac{25}{(2)}$$

(b) Make p the subject of the formula $d = 3p + 4$

$$\begin{aligned} d &= 3p + 4 \\ 3p &= d - 4 \quad \text{①} \quad \text{--- isolate } p \text{ to one side} \\ &\quad \text{of the equation} \\ p &= \frac{d-4}{3} \quad \text{①} \end{aligned}$$

$$p = \frac{d-4}{3} \quad \text{②}$$

(Total for Question 23 is 4 marks)

24 Rick, Selma and Tony are playing a game with counters.

Rick has some counters. n

Selma has twice as many counters as Rick. $2n$

Tony has 6 counters less than Selma. $2n - 6$

In total they have 54 counters.

the number of counters Rick has : the number of counters Tony has = $1 : p$

Work out the value of p .

$$\begin{aligned} \text{Counters : Rick} &= n \\ \text{Selma} &= 2n \\ \text{Tony} &= 2n - 6 \quad (1) \end{aligned}$$

Finding value of n :

$$n + 2n + 2n - 6 = 54 \text{ counters} \quad (1)$$

$$5n - 6 = 54$$

$$5n = 54 + 6$$

$$5n = 60$$

$$n = 12 \text{ counters} \quad (1)$$

\therefore Rick has 12 counters

\therefore Selma has 24 counters

\therefore Tony has 18 counters

Number of counter : Number of counter = $1 : p$
Rick has Tony has

$$12 : 18 = 1 : p \quad (1)$$

$$\frac{18}{12} = p$$

$$p = 1.5 \quad (1)$$

$$p = \dots\dots\dots 1.5$$

(Total for Question 24 is 5 marks)

25 Jo is going to buy 15 rolls of wallpaper.

Here is some information about the cost of rolls of wallpaper from each of two shops.

Chic Decor
3 rolls for £36

Style Papers
Pack of 5 rolls
normal price £70
12% off the normal price

Jo wants to buy the 15 rolls of wallpaper as cheaply as possible.

Should Jo buy the wallpaper from Chic Decor or from Style Papers?

You must show how you get your answer.

Price for Chic Decor

For 3 : 3 for £ 36

$$\text{For 15 : } \frac{15}{3} \times \text{£ } 36 = \text{£ } 180 \quad (1)$$

Price for Style Papers

$$\begin{aligned} \text{Discounted Price : } & 0.12 \times \text{£ } 70 = \text{£ } 8.40 \quad (1) \\ \text{for 5 rolls} & \quad \text{£ } 70 - \text{£ } 8.40 \\ & = \text{£ } 61.60 \quad (1) \end{aligned}$$

For 5 : 5 for £ 61.60

$$\text{For 15 : } \frac{15}{5} \times \text{£ } 61.60 = \text{£ } 184.80 \quad (1)$$

∴ Jo should buy from Chic Decor.

(Total for Question 25 is 4 marks)

26 The table gives information about the lengths, in cm, of some pieces of string.

Midpoint

5

15

25

35

45

Length (t cm)	Frequency
$0 < t \leq 10$	15
$10 < t \leq 20$	20
$20 < t \leq 30$	50
$30 < t \leq 40$	25
$40 < t \leq 50$	5

(5, 15)

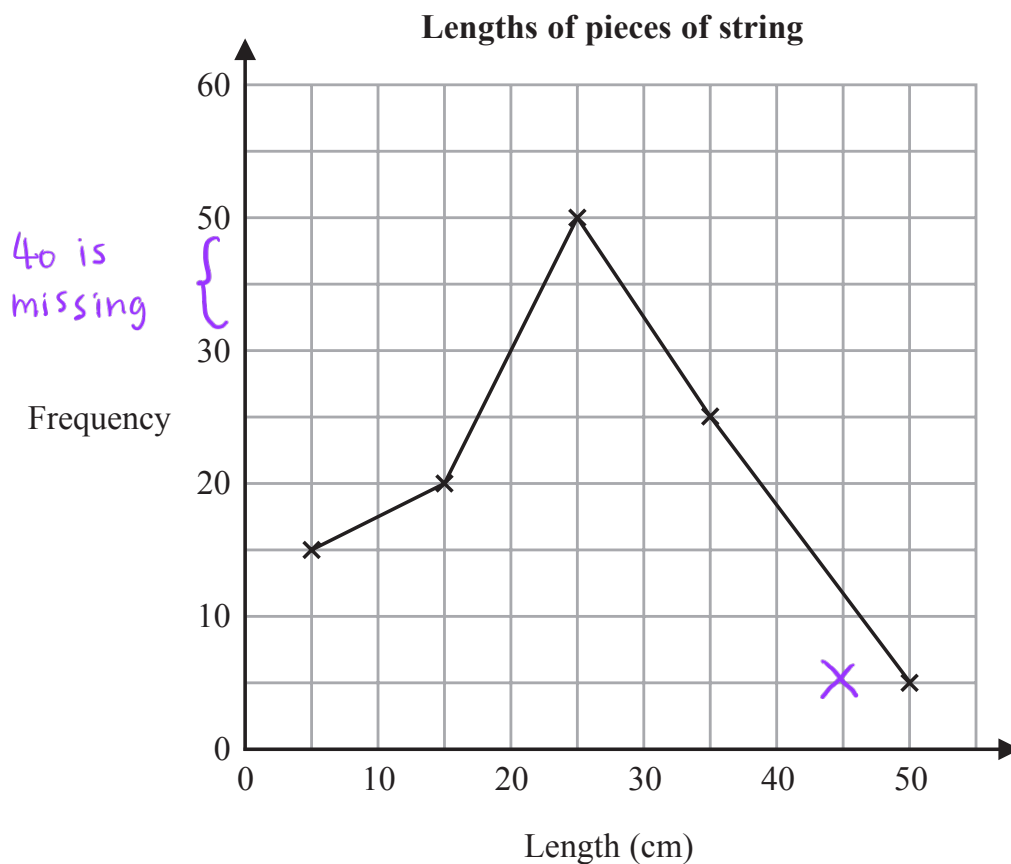
(15, 20)

(25, 50)

(35, 25)

(45, 5)

Amos draws a frequency polygon for the information in the table.



Write down **two** mistakes that Amos has made.

1. 40 is missing from frequency scale. (1)

2. Last point should be at (45, 5) (1)

(Total for Question 26 is 2 marks)

27 Jessica runs for 15 minutes at an average speed of 6 miles per hour.
She then runs for 40 minutes at an average speed of 9 miles per hour.

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

It takes Amy 45 minutes to run the same total distance that Jessica runs. $\text{distance} = \text{speed} \times \text{time}$

Work out Amy's average speed.

Give your answer in miles per hour.

$$1 \text{ hour} = 60 \text{ minutes}$$

Jessica :

$$\text{First run : } 6 \text{ miles/h} \times \frac{15}{60} \text{ h} = 1.5 \text{ miles}$$

$$\text{Second run : } 9 \text{ miles/h} \times \frac{40}{60} \text{ h} = 6 \text{ miles} \quad (1)$$

$$\text{Total distance} = 1.5 + 6 = 7.5 \text{ miles} \quad (1)$$

Amy

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{7.5 \text{ miles}}{\frac{45}{60} \text{ h}} \quad (1)$$

$$= 10 \text{ miles/h} \quad (1)$$

10

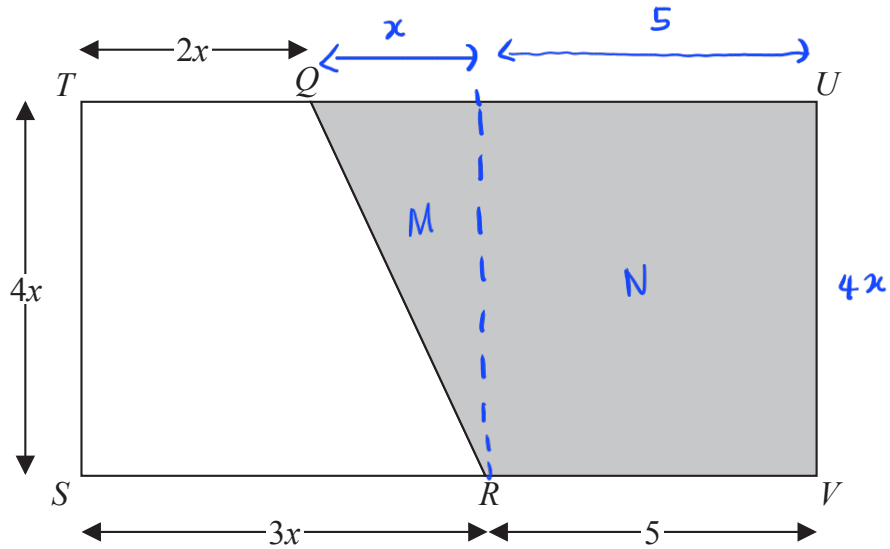
..... miles per hour

(Total for Question 27 is 4 marks)

28 The diagram shows rectangle $STUV$.

TQU and SRV are straight lines.

All measurements are in cm.



The area of trapezium $QUVR$ is $A \text{ cm}^2$

Show that $A = 2x^2 + 20x$

$$\begin{aligned} \text{Area of triangle } M &: \frac{1}{2} \times x \times 4x \\ &= 2x^2 \quad (1) \end{aligned}$$

Area of triangle = $\frac{1}{2} \times l \times h$

$$\begin{aligned} \text{Area of square } N &: 5 \times 4x \\ &= 20x \end{aligned}$$

$$\text{Area of trapezium } QUVR = \text{Area of } M + \text{area of } N \quad (1)$$

$$A = 2x^2 + 20x \quad (1)$$

(Total for Question 28 is 3 marks)

29 Change 30 metres per second to kilometres per hour.

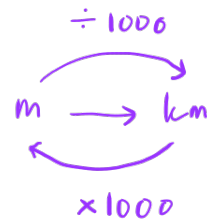
$$\frac{30 \text{ metres}}{1 \text{ second}} \div 1000 = \frac{0.03 \text{ km}}{1 \text{ second}} \quad \textcircled{1}$$

↑
convert to km

$$\frac{0.03 \text{ km}}{1 \text{ second}} \times 3600 = 0.03 \times 3600$$

$$= 108 \text{ km/h} \quad \textcircled{1}$$

↑
convert to hour



$$1 \text{ hour} = 60 \text{ minutes}$$

$$1 \text{ hour} = 60 \text{ min} \times 60 \text{ secs}$$

$$= 3600 \text{ secs}$$

108 kilometres per hour

(Total for Question 29 is 2 marks)

30 The value of Michelle's car has decreased by 15%

The car now has a value of £13 600

Work out the value of Michelle's car before the decrease.

$$100\% = x$$

$$85\% = \pounds 13\,600$$

$$\frac{100}{85} = \frac{x}{13\,600}$$

$$x = \frac{100}{85} \times 13\,600 \quad \textcircled{1}$$

$$= 16\,000 \quad \textcircled{1}$$

£ 16 000

(Total for Question 30 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

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