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 | Candidate Number

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

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

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.

Percent is out of 100

$\frac{35}{100}$

(Total for Question 1 is 1 mark)

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

'Of' means to multiply. 1/4 × 28 = 7

7

(Total for Question 2 is 1 mark)

3 Write down two factors of 12

12 can be divided by both 1 and 12 so these are factors of 12

1 12

(Total for Question 3 is 1 mark)

4 Simplify $2m \times 3$

2 × m × 3 = 2 × 3 × m = 6 × m = 6m

6m

(Total for Question 4 is 1 mark)

5 Find $\sqrt{1.69}$

Typing it into the calculator

1.3

(Total for Question 5 is 1 mark)

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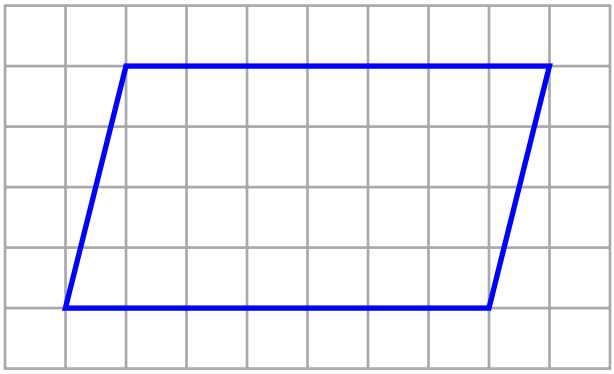
6



On the grid, draw a quadrilateral with

no lines of symmetry
and rotational symmetry of order 2

Parallelograms have no lines of symmetry (lines which divide the shape in two so that both halves are a reflection of each other) and can be rotated twice within a full turn to look the same

(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	= 253
Number of oranges	68	+	80	+	76	= 224

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

Adding the number of each type of fruit sold each week gives the total amount of each type of fruit sold for the three weeks

253 − 224

Subtracting the 224 oranges sold from the 253 apples sold works out that there were 29 more apples than oranges sold for the three weeks

29

(Total for Question 7 is 3 marks)

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

3 8 13 18 23

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

8 - 3 = 5 and 13 - 8 = 5. The sequence is going up in 5s.
Adding 5 to 23 gives 28 then adding 5 to 28 gives 33

28 33

(1)

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

(b) Explain why.

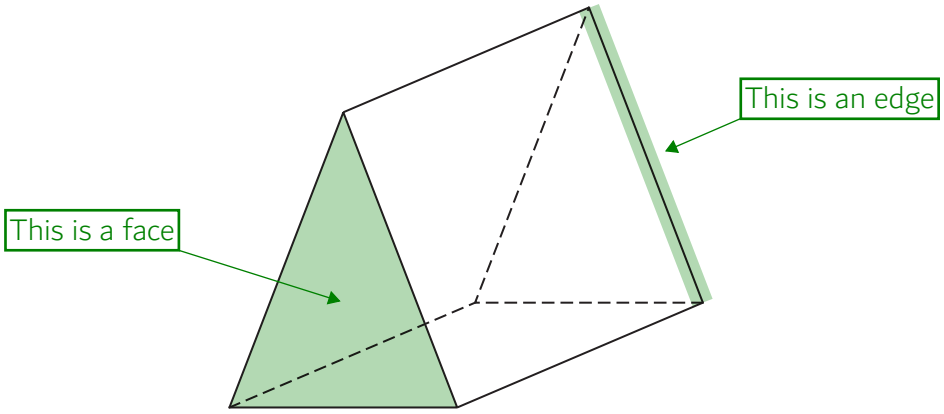
It doesn't end in a 3 or 8

All terms in the sequence end in a 3 or a 5

(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)

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

9

(1)

(Total for Question 9 is 2 marks)

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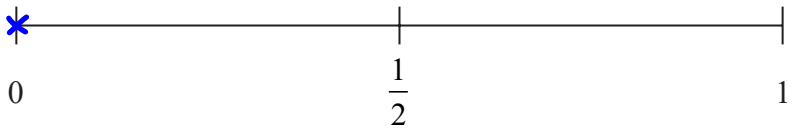
10 Here is a list of 8 numbers.

2 2 3 5 6 6 8 9

Kim picks at random one of these numbers.

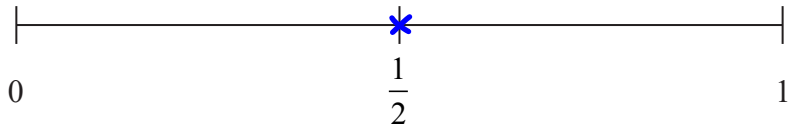
(a) On the probability scale below, mark with a cross (×) the probability that Kim picks a number 7



There are no 7s so there is no chance of getting a 7

(1)

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



6, 6, 8 and 9 are greater than 5. This is 4/8 of the numbers, which simplifies to 1/2

(1)

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

Numbers divisible by 2 which end in 0, 2, 4, 6, 8 are even. 2, 2, 6, 6 and 8 are the even numbers in the list. This is 5 out of the 8 numbers

5/8

(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.

48×3 ← This works out that there are 144 nails in 3 boxes of 48

$144 \div 4 = 36$ ← Dividing the 144 nails by 4 works out that there is 36 lots of 4, which means there are enough nails to make 36 picture frames

Yes ← The 36 picture frames which can be made is more than the 35 she wants to make

(Total for Question 11 is 3 marks)

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

$\frac{60}{1000}$ ← Expressing the 60 metres as a fraction of 1000 metres

The calculator simplifies the fraction →

$\frac{3}{50}$

(Total for Question 12 is 2 marks)

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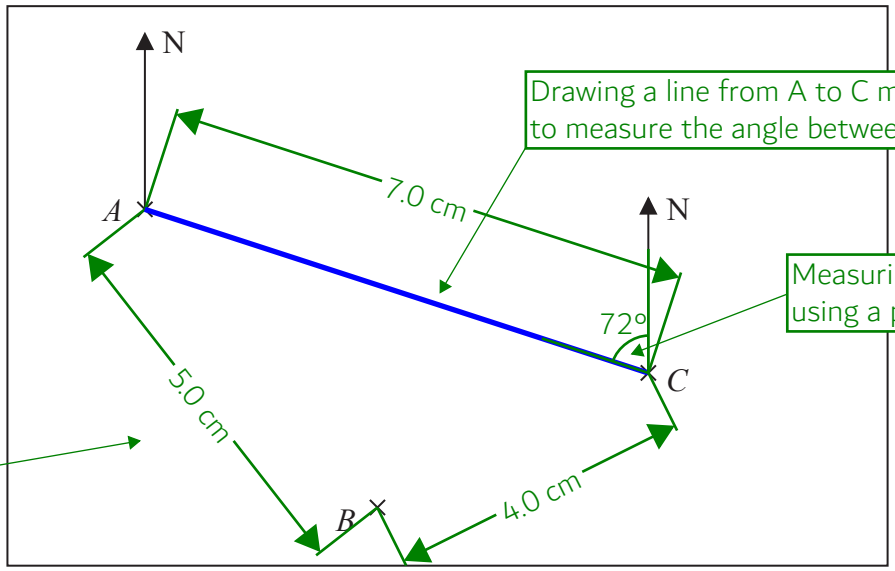
13 The accurately drawn map shows the positions of three points, A, B and C, in a field.



Drawing a line from A to C makes it easier to measure the angle between them

Measuring the angle using a protractor

Measuring each of the distances with a ruler

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?

5+4 ← Adding the distance from A to B to the distance from B to C works out that Parveen walks 9 cm on the map

9-7 ← Subtracting the distance Susan walks on the map works out that Parveen walks 2 cm more than Susan on the map

2×150 ← 1 cm represents 150 m so multiplying the 2 cm by 150 works out that it represents 300 m

300 metres

(3)

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

360−72 ← Subtracting the 72° anticlockwise from north from C to A works out that it is 288° clockwise from north from C to A. This is the bearing

288 °

(1)

(Total for Question 13 is 4 marks)

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

4 5 6 6 6 7 7 8 8 8 8 9

(a) Find the median.

The numbers are already written in order. Crossing off from either end works out that 7 and 7 are in the middle. Therefore the median must be 7

7

(1)

(b) Work out the range.

9-4 ← Range is the difference between the largest and smallest value

5

(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 and range is greater for the boys

The median of 7 is greater than the median of 6.
The range of 5 is greater than the range of 3

(2)

(Total for Question 14 is 4 marks)

15 Work out $\dfrac{2.75 \times 14.6}{10 - 1.97}$

Type it into the calculator exactly as it is

5

(Total for Question 15 is 2 marks)

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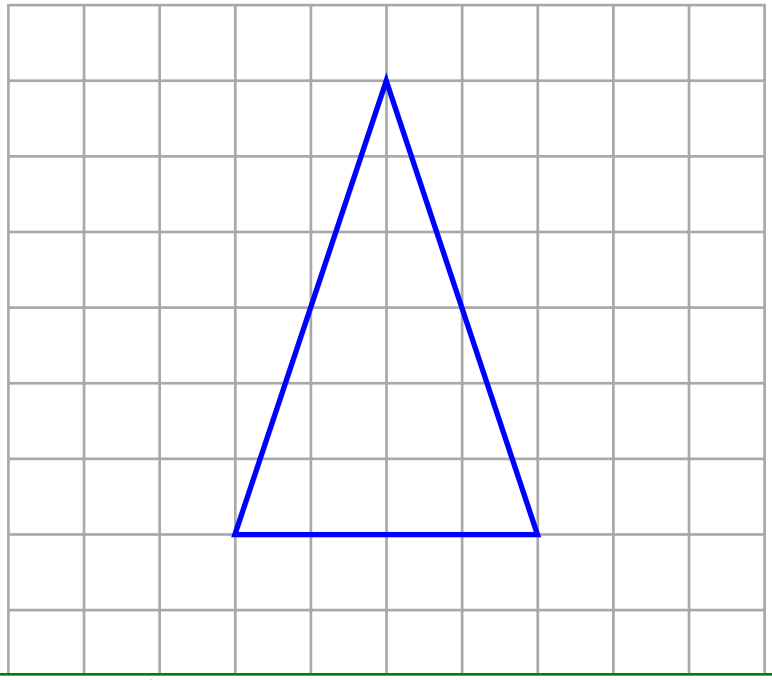
16 On the centimetre grid, draw an isosceles triangle with an area of 12 cm^2

$\frac{1}{2}bh = 12$

$bh = 24$



Area of triangle = 1/2 × base × height. Multiplying both sides by 2 eliminates the 1/2 and finds that the base × height must be 24. The base could be 4 and the height could be 6 as 4 × 6 = 24. Isosceles triangles have two equal sides

(Total for Question 16 is 2 marks)

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

3 × 4 = 12
3 × -2x = -6x

$12 - 6x$

(1)

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

$3y = 48$ ← Multiplying both sides by 4 eliminates the denominator

Dividing both sides by 3 gets y on its own

$y =$ 16

(2)

(c) Factorise $4p + 6$

2 is the highest common factor of 4p and 6. Bringing this out as a factor, dividing both 4p and 6 by it and leaving the result in a bracket

$2(2p + 3)$

(1)

(Total for Question 17 is 4 marks)

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

The second significant figure is the 5. The 3 after this causes it to round down then everything after the second significant figure is set to 0

2500

(1)

(b) Write 0.0874 correct to 1 significant figure.

The first significant figure is the 8. The 0s before this are not significant. The 7 after the 8 causes it to round up then everything after it is set to 0 and is ignored

0.09

(1)

(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?

$\frac{3}{8} \times 400$ ← This works out that there are 150 red counters. 'Of' means to multiply

$400 - 150 - 82$ ← Subtracting the red and yellow counters from the total number of counters leaves 168 green counters

$\frac{168}{400} \times 100$ ← Expressing the 168 green counters as a fraction of the 400 counters then multiplying it by 100 to convert it into a percentage

42 %

(Total for Question 19 is 4 marks)

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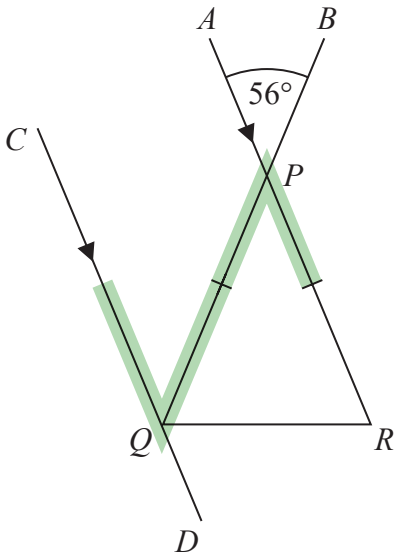
20 In the diagram, PQR is an isosceles triangle with $PQ = PR$.



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

Angle $APB = 56°$

Work out the size of angle CQR.
Give a reason for each stage of your working.

Angle QPR = 56° as vertically opposite angles are equal

Angles APB and QPR are vertically opposite

(180 - 56) ÷ 2 = 62
Angle PQR = 62° as the base angles of an isosceles triangle are equal and there are 180° in total in a triangle

The base angles are opposite the equal sides in the isosceles triangle. Subtracting the 56° from the 180° leaves the total of both the other two angles in the triangle. As they are both equal, this total can be divided by 2 to work out each angle

Angle CQP = 56° as alternate angles are equal

The insides of the Z-shape are alternate angles and are equal. This is angles CQP and QPR

56 + 62 = 118
Angle CQR = 118°

Adding angles CQP and PQR must give angle CQR

(Total for Question 20 is 5 marks)

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

$24 = 2^3 \times 3$
$56 = 2^3 \times 7$

Using the calculator to express both numbers as a product of prime factors

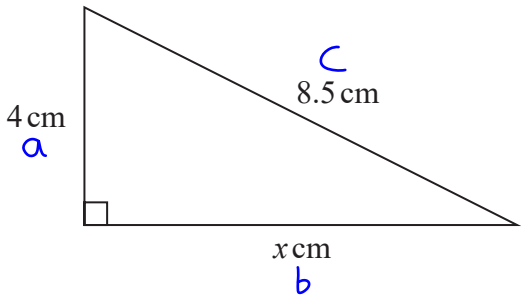
$2^3 \times 3 \times 7$ ← The LCM is the highest power of each prime multiplied together

Newer Casio calculators can work out the LCM of two numbers without having to do this method

168

(Total for Question 21 is 2 marks)

22 Here is a right-angled triangle.



Work out the value of x.

$a^2 + b^2 = c^2$ ← Pythagoras' Theorem can be used to find the missing side in a right-angled triangle

$b^2 = c^2 - a^2$ ← Labelling the sides on the triangle. c is the longest side and the other two can be a and b. Subtracting a^2 from both sides to get b^2 on its own

$x = \sqrt{8.5^2 - 4^2}$ ← Square rooting both sides makes b the subject. Substituting in the values

$x =$ 7.5

(Total for Question 22 is 2 marks)

23 $T = 4m^2 - 11$

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

$4(-3)^2 - 11$ ← Substituting -3 for m

$T =$ 25

(2)

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

$d - 4 = 3p$ ← Subtracting 4 from both sides

Dividing both sides by 3 → $\frac{d-4}{3} = p$

(2)

(Total for Question 23 is 4 marks)

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

Rick has some counters.
Selma has twice as many counters as Rick.
Tony has 6 counters less than Selma.

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.

$R+2R+2R-6=54$ ← Let R be the number of counters Rick has. Selma has twice as many as Rick so must have 2R. Tony has 6 less than Selma so must have 2R - 6. Adding the expressions for the numbers of counters Rick, Selma and Tony have must equal to 54 as this is the total number of counters

$5R=60$ ← Collecting like terms and adding 6 to both sides

$R=12$ ← Dividing both sides by 5 finds that Rick has 12 counters

12×2 ← This works out that Selma has 24 counters

$24-6$ ← This works out that Tony has 18 counters

$12:18$ ← Writing the ratio of the number of counters Rick has to the number of counters Tony has

$18\div12$ ← Dividing both sides by 12 simplifies the ratio to have 1 part on the left. The right side also needs to be divided by 12

The ratio is 1 : 1.5

$p =$ 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	**Style Papers**
3 rolls for £36	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.

$15 \div 3$ ← Dividing the 15 rolls needed by the lots of 3 rolls from Chic Decor works out that 5 lots of 3 rolls need to be bought

$5 \times 36 = 180$ ← Each lot of 3 rolls cost £36 so multiplying this cost by the 5 lots needed works out that the 15 rolls will cost £180 from Chic Decor

$15 \div 5$ ← Dividing the 15 rolls needed by the packs of 5 rolls from Style Papers works out that 3 packs of 5 rolls need to be bought

3×70 ← Each pack of 5 rolls cost £70 so multiplying this cost by the 3 packs needed works out that the 15 rolls will cost £210 from Style Papers before the discount

$210 \times \frac{100-12}{100} = 184.8$ ← 100% is the full cost. Subtracting 12% expresses the percentage it decreases to when 12% is taken off the cost. Putting this over 100 converts it into a fraction. When the £210 is multiplied by this fraction, it is reduced by 12%. This works out that the cost of the 15 rolls will cost £184.80 after the discount

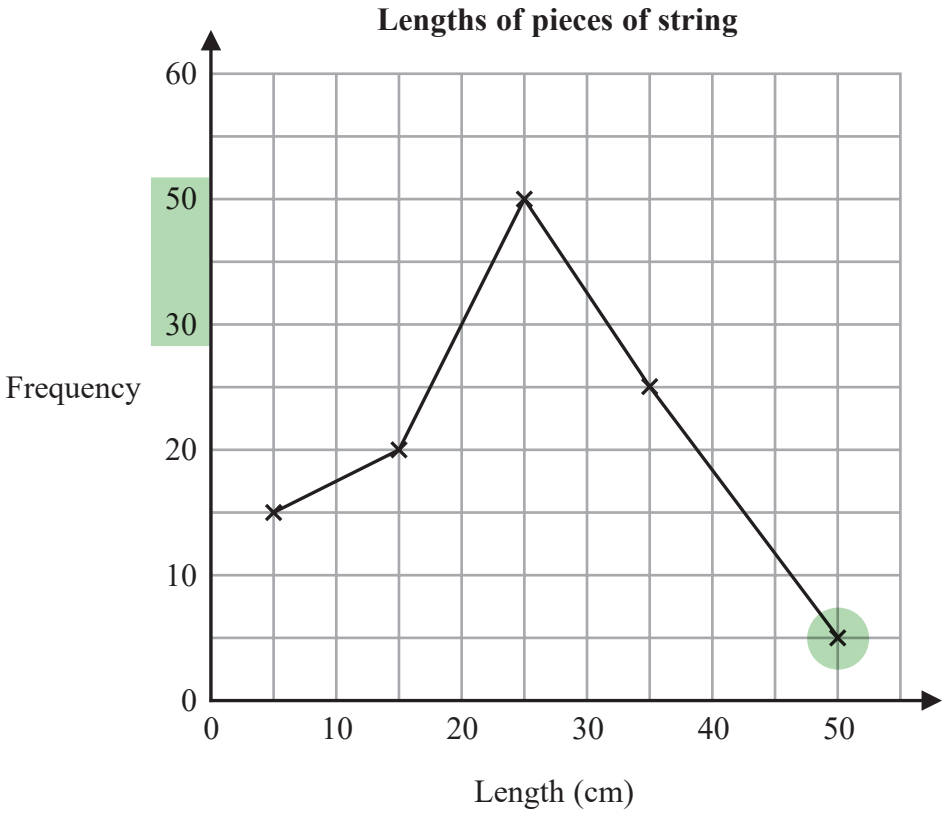
Chic Decor ← The cost of 15 rolls from Chic Decor is £180 and the cost of 15 rolls from Style Papers is £184.80. It is cheaper from Chic Decor

(Total for Question 25 is 4 marks)

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

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

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



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

1 Last point is incorrect All of the points should be plotted at the midpoints of each length interval. It should be plotted at the length of 45 cm as this is the midpoint of 40 and 50

2 The frequency scale misses out 40 The scale goes up in 10s but skips from 30 to 50

(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.

It takes Amy 45 minutes to run the same total distance that Jessica runs.

Work out Amy's average speed.
Give your answer in miles per hour.

$S \; d \; t$ ← Writing a formula triangle for speed, distance and time. From the formula triangle, speed = distance ÷ time. Amy's time is given but not the distance so this needs to be calculated first

$6 \times \frac{15}{60} = 1.5$
$9 \times \frac{40}{60} = 6$
← From the formula triangle, distance = speed × time. The times needs to be in hours as the unit of speed involves hours. There are 60 minutes in an hour so dividing the times in minutes by 60 converts them into hours

$1.5 + 6$ ← Adding the 1.5 miles Jessica ran in the first part and the 6 miles Jessica ran in the second part works out that her total distance was 7.5 miles. Amy also runs this distance

$7.5 \div \frac{45}{60}$ ← From the formula triangle, speed = distance ÷ time. The time needs to be in hours as the unit of speed involves hours. There are 60 minutes in an hour so dividing the time in minutes by 60 converts it into hours

10 miles per hour

(Total for Question 27 is 4 marks)

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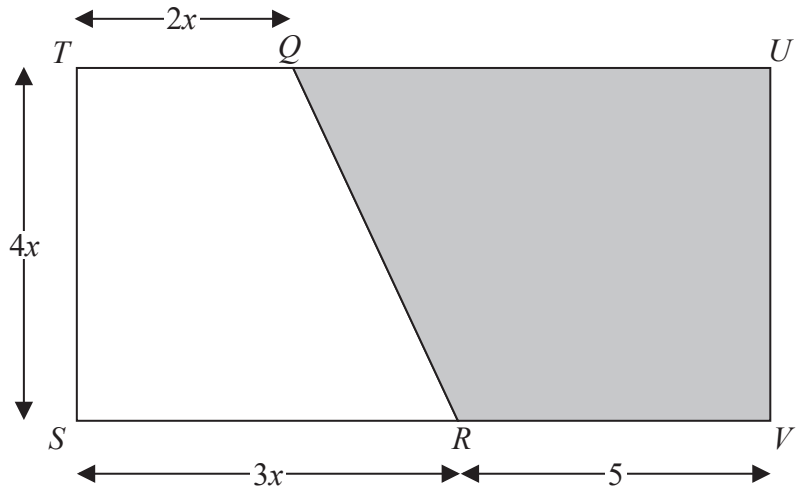
28 The diagram shows rectangle *STUV*.
TQU and *SRV* are straight lines.
All measurements are in cm.



The area of trapezium *QUVR* is A cm^2

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

$3x+5-2x=x+5$ ← The length of SV is 3x + 5. Subtracting the length of TQ leaves the length of QU

$A=\frac{1}{2}(x+5+5)\times 4x$ ← Area of trapezium = 1/2 (a + b)h, where a and b are the parallel sides and h is the distance between them. a is length QU, b is length RV and h is length TS

$=2x(x+10)$ ← Simplifying by multiplying the 1/2 by 4x and collecting collecting like terms in the bracket

$=2x^2+20x$ ← Expanding the bracket

(Total for Question 28 is 3 marks)

29 Change 30 metres per second to kilometres per hour.

$30 \div 1000 = 0.03$ ← There are 1000 metres in a kilometre so dividing the 30 metres by 1000 converts it into kilometres

$1 \div 60$

$\frac{1}{60} \div 60 = \frac{1}{3600}$ ← There are 60 seconds in a minute so dividing 1 second by 60 converts it into minutes. There are 60 minutes in an hour so dividing by 60 again converts it into hours

$0.03 \div \frac{1}{3600}$ ← Kilometres per hour means number of kilometres divided by number of hours

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.

$100 - 15$ ← 100% is the original amount before the decrease. Subtracting the 15% works out that it had decreased to 85%

$13600 \div 85$ ← Dividing the £13600 by the 85 works out the value of 1%

160×100 ← Multiplying the value of 1% by 100 works out the value of 100%

£ 16000

(Total for Question 30 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS