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EDEXCEL INTERNATIONAL GCSE MATHS: QUESTIONS BY TOPIC

Constructions, Loci, Congruence & Similarity (G2)

International GCSE Mathematics A (4MA1) · Foundation tier

37 questions · 115 marks · Mark schemes included

Past papers January 2019 - June 2025 · 3 sub-topics

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HOW TO USE THIS BOOKLET

Questions are grouped by sub-topic and run from the lowest to the highest mark tariff, then oldest paper first.

Click any row below to jump straight to that sub-topic or question.

On every question page, click ANSWER in the top-right corner to jump to its mark scheme; < QUESTION brings you back.

A gold bar in the left margin marks exactly where the question sits on the original page.

Diagrams, graphs, grids and tables are printed exactly as they appear in the original papers.

Each question is filed under its main topic; longer questions may also test skills from other topics.

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G2a CONSTRUCTIONS, LOCI & SCALE DRAWINGS		21 Qs · 51 marks	3
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G2b CONGRUENCE & SIMILARITY		15 Qs · 60 marks	25
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QUESTIONS

37 questions · 115 marks · 3 sub-topics

SUB-TOPIC G2a

CONSTRUCTIONS, LOCI & SCALE DRAWINGS

Sub-topic G2a · 21 questions · 51 marks · lowest tariff first



- 15 Use ruler and compasses only to construct the perpendicular bisector of the line AB .
You must show all of your construction lines.

A ————— B

(Total for Question 15 is 2 marks)



10 Here is a sketch of triangle ABC .

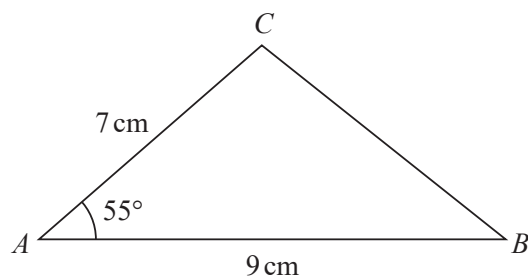
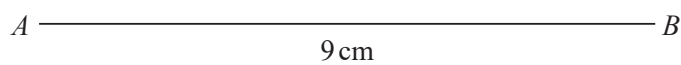


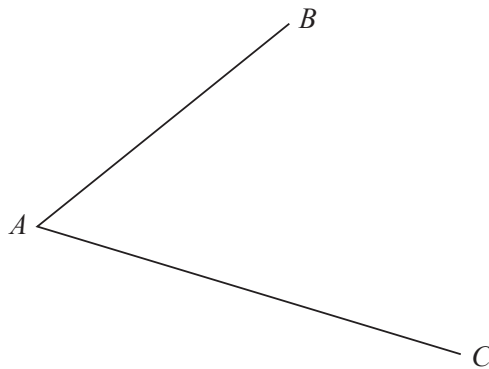
Diagram **NOT**
accurately drawn

In the space below, make an accurate drawing of triangle ABC .
The line AB has been drawn for you.



(Total for Question 10 is 2 marks)

- 21 Use ruler and compasses to construct the bisector of angle BAC .
You must show all your construction lines.



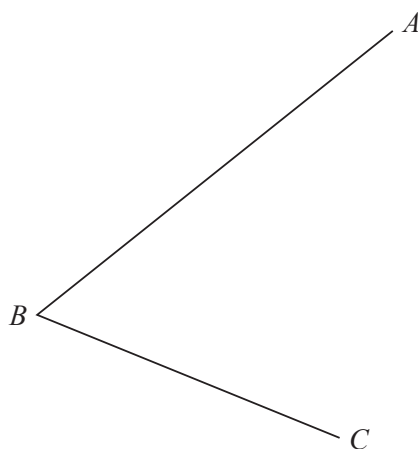
(Total for Question 21 is 2 marks)



17 Show that $3\frac{3}{4} \times \frac{7}{9} = 2\frac{11}{12}$

(Total for Question 17 is 3 marks)

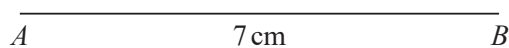
- 18 Using ruler and compasses only, construct the bisector of angle ABC .
You must show all your construction lines.



(Total for Question 18 is 2 marks)

- 10 ABC is a triangle.
 $AB = 7\text{ cm}$ and $BC = 6.2\text{ cm}$
Angle $ABC = 65^\circ$

Draw accurately the triangle ABC .
The line AB has been drawn for you.



(Total for Question 10 is 2 marks)

- 11 A circle has radius 7.5 cm

Work out the area of the circle.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 11 is 2 marks)



11 ABC is a triangle.

$$AB = 9 \text{ cm}, AC = 5 \text{ cm and } BC = 8 \text{ cm.}$$

Use ruler and compasses to construct triangle ABC with AB as its base.

You must show all construction lines.

The line AB has been drawn for you.

A ————— B

(Total for Question 11 is 2 marks)



- 9 ABC is a triangle.
 $AB = 8\text{ cm}$, $AC = 6\text{ cm}$ and $BC = 9\text{ cm}$.

Use a ruler and compasses to construct the triangle ABC .
The side AB has been drawn for you.
You must show all your construction lines.

A ————— B
8 cm

(Total for Question 9 is 2 marks)



- 11 Triangle ABC is an equilateral triangle of side 6 cm.

Using a ruler and compasses only, construct triangle ABC
You must show all your construction lines.

Side AB has been drawn for you.

A ————— B

(Total for Question 11 is 2 marks)

- 12 Mario is going to play two games on Saturday.

He will play one game on Saturday morning and one game on Saturday afternoon.

The following table shows the games from which he is going to choose.

Morning	Afternoon
Bridge (B)	Ludo (L)
Chess (C)	Mahjong (M)
Draughts (D)	Snakes and ladders (S)

- (a) Write down all the possible combinations of games that Mario can play on Saturday.

.....

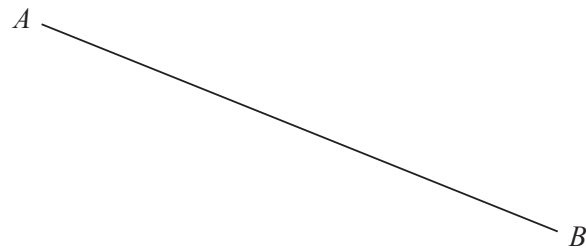
.....

.....

(2)



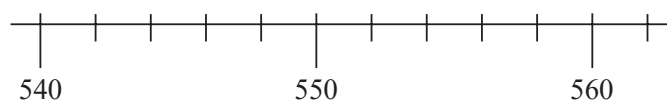
- 18** Use ruler and compasses only to construct the perpendicular bisector of line AB
You must show all your construction lines.



(Total for Question 18 is 2 marks)



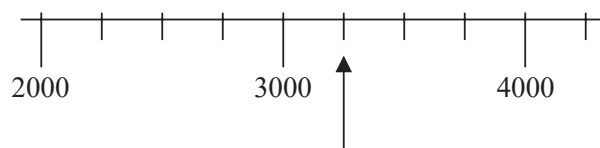
3 Here is a number scale.



(a) On the scale, mark with an arrow (↗) the number 554

(1)

Here is a different number scale.



(b) Write down the number shown marked by the arrow.

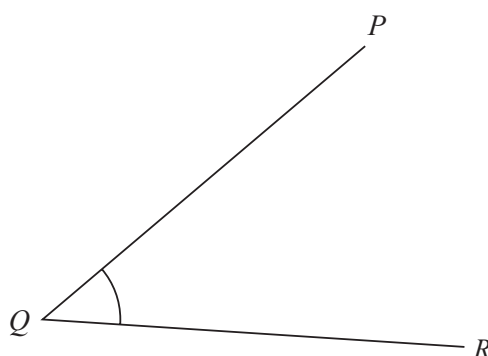
.....
(1)

(Total for Question 3 is 2 marks)

4 (a) In the space below, draw a line of length 6.5 cm

(1)

The diagram shows the straight lines QP and QR



(b) Measure the size of angle PQR

.....
(1)

(Total for Question 4 is 2 marks)

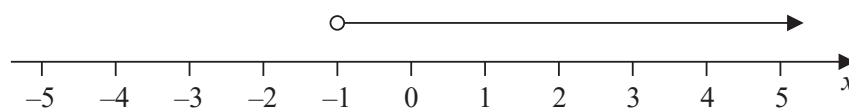
17 $-8 < 2y \leq 2$

y is an integer.

(a) Find all the possible values of y

.....
(2)

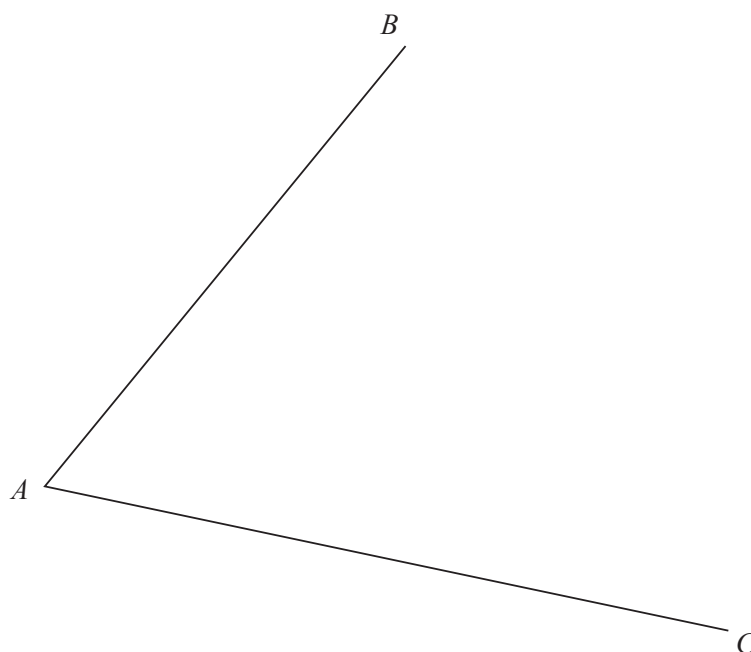
(b) Write down the inequality shown on the number line.



.....
(1)

(Total for Question 17 is 3 marks)

18 Using ruler and compasses only, construct the bisector of angle BAC
You must show all your construction lines.



(Total for Question 18 is 2 marks)



9 Here is a sketch of triangle ABC

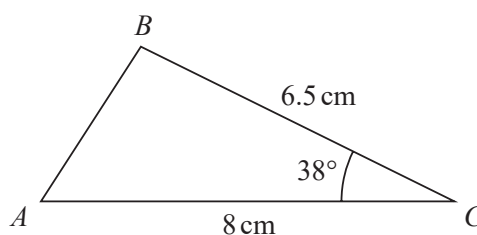


Diagram **NOT**
accurately drawn

$$AC = 8\text{ cm} \quad BC = 6.5\text{ cm} \quad \text{angle } ACB = 38^\circ$$

In the space below, make an accurate drawing of triangle ABC
The line AC has been drawn for you.



(Total for Question 9 is 2 marks)

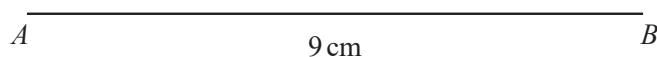


- 9 ABC is an equilateral triangle with sides of length 9 cm.

Use a ruler and compasses only to **construct** the triangle ABC

The side AB has been drawn for you.

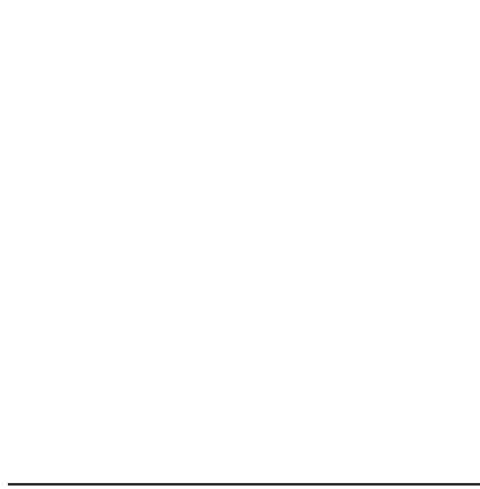
You must show all your construction lines.



(Total for Question 9 is 2 marks)



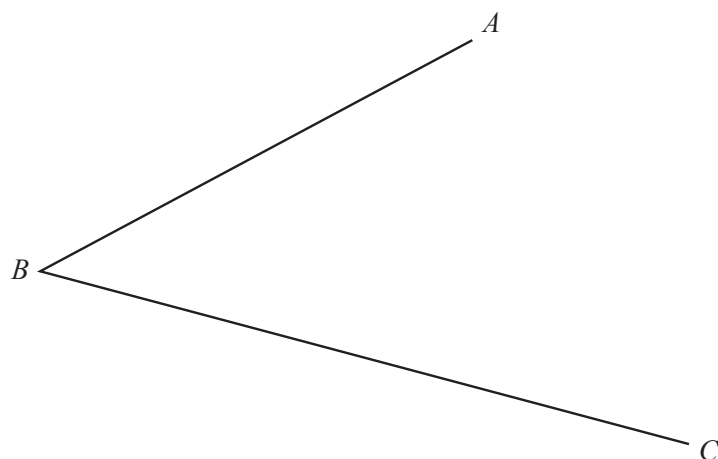
- 10** Use a ruler and compasses only to construct a square with sides of length 7 cm.
You must show all your construction lines.
Two sides of the square have been drawn for you.



(Total for Question 10 is 2 marks)



- 19 Use ruler and compasses only to construct the bisector of angle ABC
You must show all your construction lines.



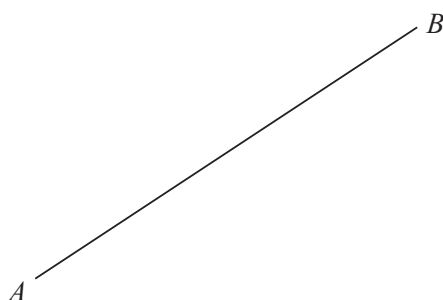
(Total for Question 19 is 2 marks)



20 Show that $7\frac{1}{3} - 3\frac{4}{7} = 3\frac{16}{21}$

(Total for Question 20 is 3 marks)

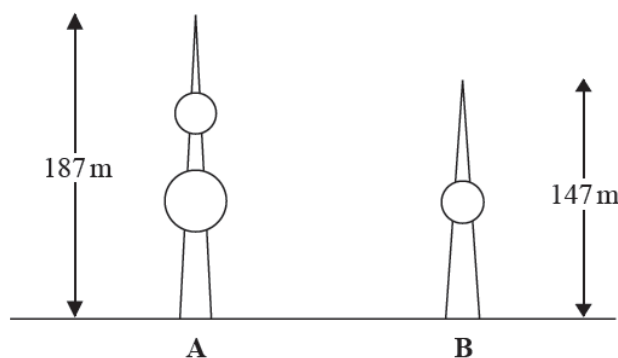
- 21 Using ruler and compasses only, construct the perpendicular bisector of the line AB
Show all your construction lines.



(Total for Question 21 is 2 marks)



22 The diagram shows two water towers in Kuwait.



The real height of tower **A** is 187 m.

The real height of tower **B** is 147 m.

Ahmed makes a scale model of both towers.

The height of tower **A** on the scale model is 90 cm.

Work out the height of tower **B** on the scale model.

Give your answer correct to the nearest centimetre.

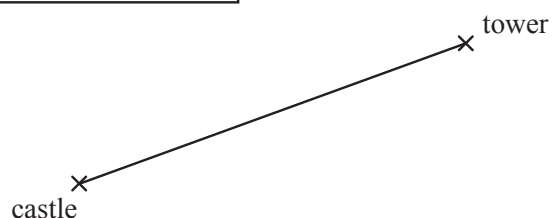
cm

(Total for Question 22 is 3 marks)



10 The scale diagram shows the positions of a castle and a tower.

1 cm represents 1.5 km



Angela walks from the castle to the tower along a straight path.

She takes 18 minutes to walk each km.

Work out how many minutes Angela takes to walk from the castle to the tower.

..... minutes

(Total for Question 10 is 3 marks)

11 Make d the subject of the formula $c = 8d + 5$

.....

(Total for Question 11 is 2 marks)

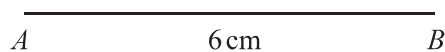


10 ABC is an isosceles triangle.

$$AB = 6 \text{ cm.}$$

$$AC = BC = 7 \text{ cm.}$$

- (a) Use ruler and compasses to construct triangle ABC .
You must show all your construction lines.
The line AB has been drawn for you.



(2)

- (b) Use ruler and compasses to construct the perpendicular bisector of the line DE .
You must show all your construction lines.

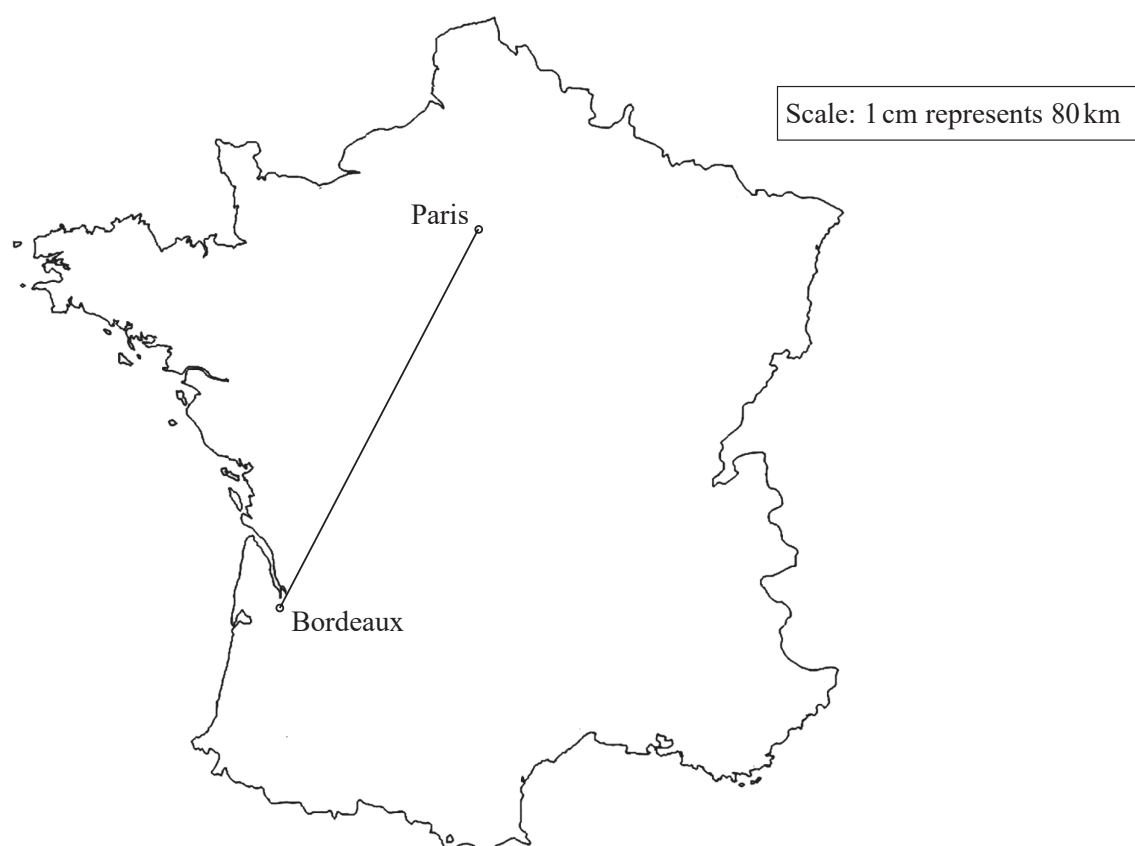


(2)

(Total for Question 10 is 4 marks)



8 Here is a scale drawing showing the positions of Paris and Bordeaux.



Alain drives from Paris to Bordeaux.
The distance that he drives is 590 km.

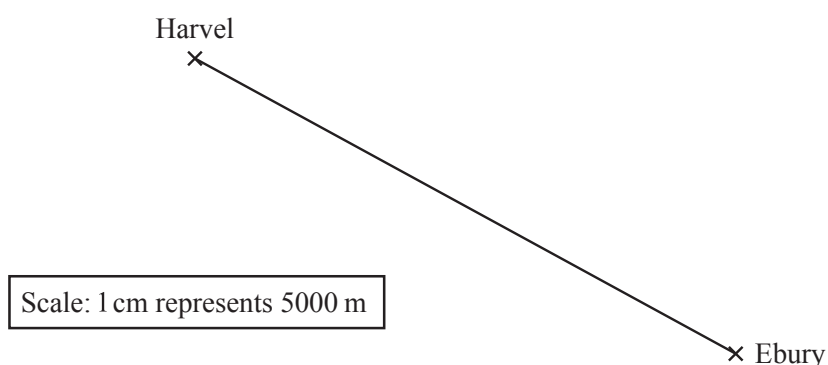
This distance is greater than the actual straight line distance between Paris and Bordeaux.

How much greater?
Show your working clearly.

..... km

(Total for Question 8 is 4 marks)

12 The scale drawing shows the positions of two towns, Harvel and Ebury.



(a) Work out the real distance, in kilometres, between Harvel and Ebury.

..... kilometres
(3)

On Saturday, Luisa cycles directly from Harvel to Ebury.

Luisa leaves Harvel at 12 50
She arrives at Ebury at 17 15

(b) Work out the time Luisa takes to cycle directly from Harvel to Ebury.

..... hours minutes
(2)

(Total for Question 12 is 5 marks)



SUB-TOPIC G2b

CONGRUENCE & SIMILARITY

Sub-topic G2b · 15 questions · 60 marks · lowest tariff first



20

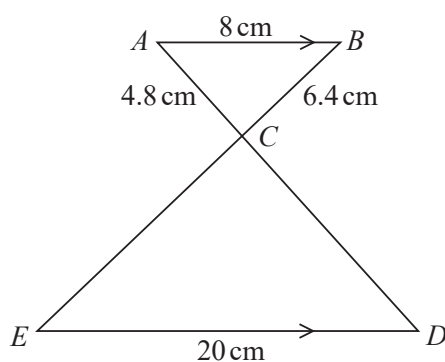


Diagram **NOT**
accurately drawn

AB is parallel to ED .
 ACD and BCE are straight lines.

$AB = 8$ cm
 $AC = 4.8$ cm
 $BC = 6.4$ cm
 $ED = 20$ cm

Work out the length of BE .

cm

(Total for Question 20 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS



5 (a) Simplify $10a \times b$

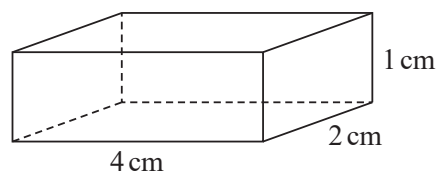
.....
(1)

(b) Solve $n + 3 = 7$

$n =$
(1)

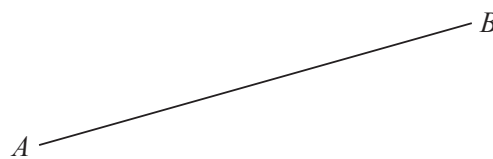
(Total for Question 5 is 2 marks)

6 (a) Write down the mathematical name of this 3-D shape.



.....
(1)

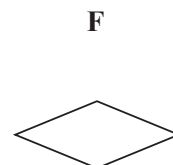
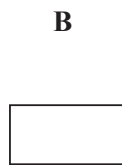
(b)



Measure the length of AB .

..... cm
(1)

Here are six shapes.



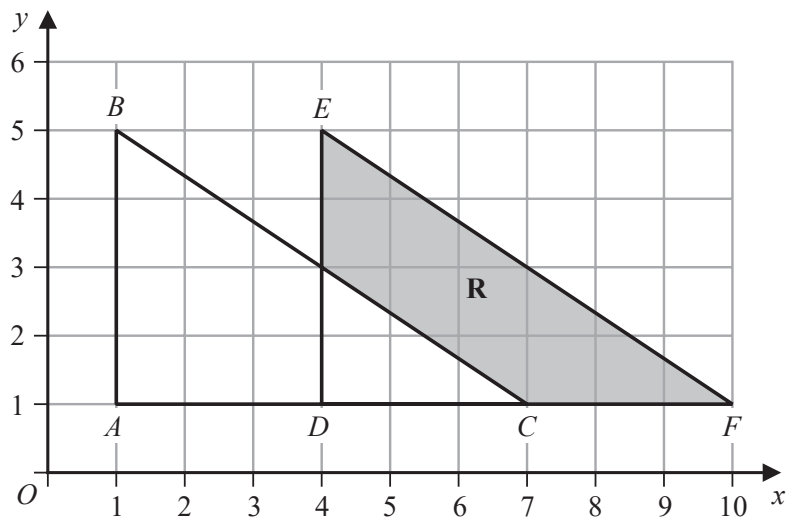
Two of these shapes are congruent.

(c) Write down the letters of these two shapes.

..... and
(1)

(Total for Question 6 is 3 marks)

- 9 The diagram shows two congruent triangles, ABC and DEF , drawn on a centimetre grid.

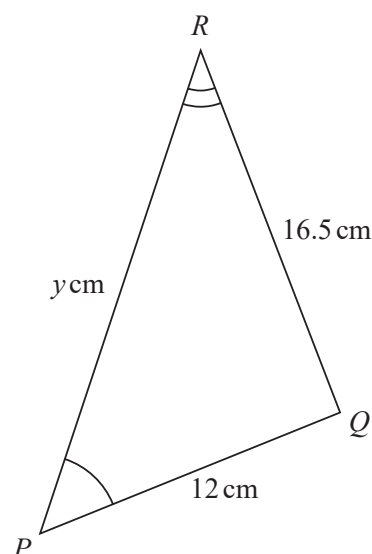
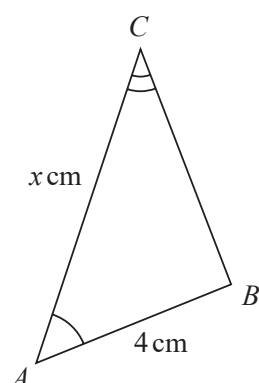


Find the area of the region **R**, shown shaded in the diagram.

..... cm^2

(Total for Question 9 is 3 marks)

18

Diagram **NOT**
accurately drawnTriangle ABC is similar to triangle PQR

$$AB = 4 \text{ cm} \quad PQ = 12 \text{ cm} \quad RQ = 16.5 \text{ cm} \quad AC = x \text{ cm} \quad PR = y \text{ cm}$$

(a) Calculate the length of BC

..... cm
(2)

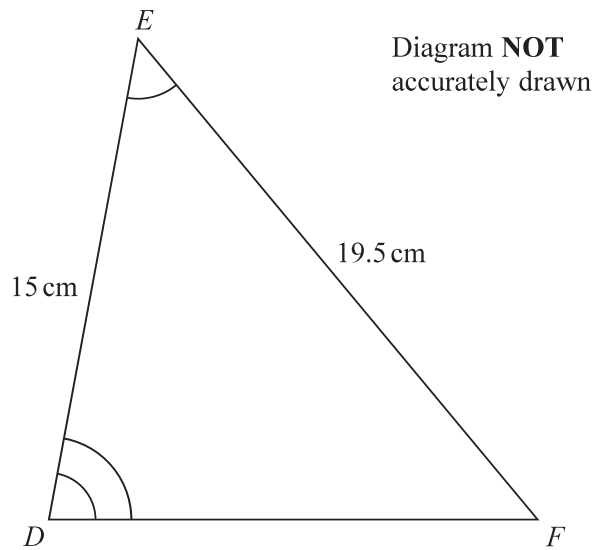
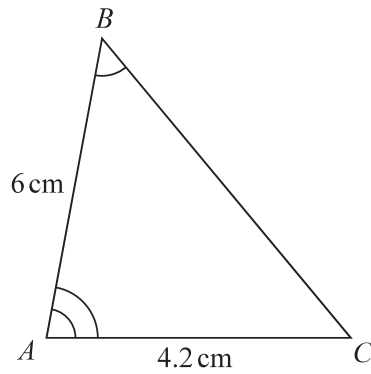
(b) Write down an expression for y in terms of x

$y =$
(1)

(Total for Question 18 is 3 marks)



17 ABC and DEF are similar triangles.



(a) Work out the length of DF .

..... cm
(2)

(b) Work out the length of BC .

..... cm
(2)

(Total for Question 17 is 4 marks)

20 ABC and DEF are similar triangles.

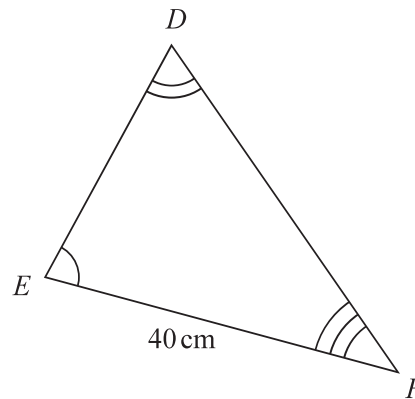
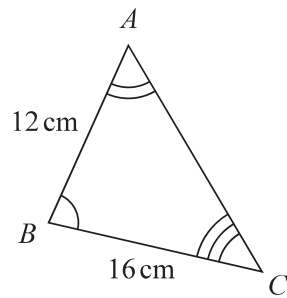


Diagram **NOT**
accurately drawn

(a) Work out the length of DE .

..... cm
(2)

The area of triangle DEF is 525 cm^2

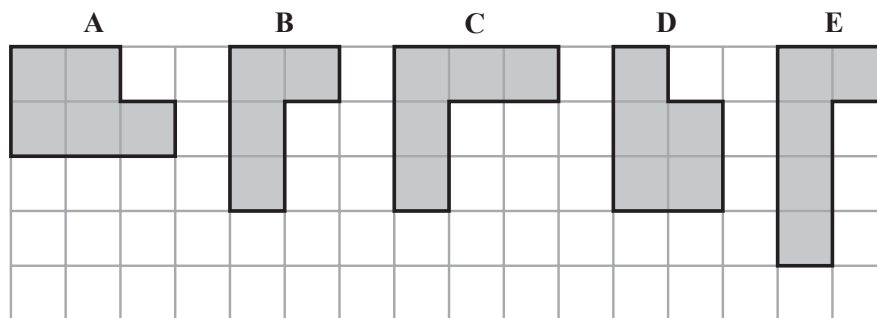
(b) Find the area of triangle DEF in m^2

..... m^2
(2)

(Total for Question 20 is 4 marks)



- 3 The diagram shows five shaded shapes on a grid of squares.

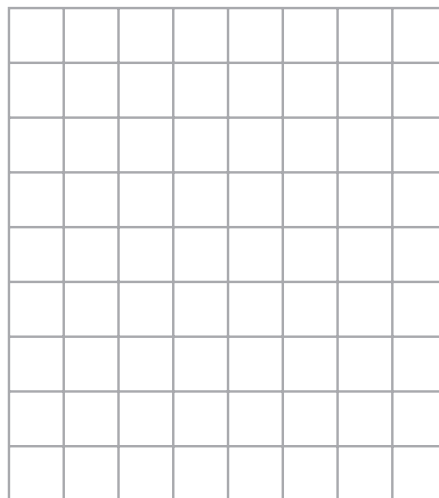


Two of the shapes are congruent.

- (a) Write down the letters of these shapes.

..... and (1)

- (b) On the square grid below, draw a shape that is similar to but is **not** congruent to shape **B**.



(2)

All of the shapes on the grid have 6 sides.

- (c) Write down the mathematical name for a shape that has 6 sides.

..... (1)

(Total for Question 3 is 4 marks)

20 ABC and DEF are similar triangles.

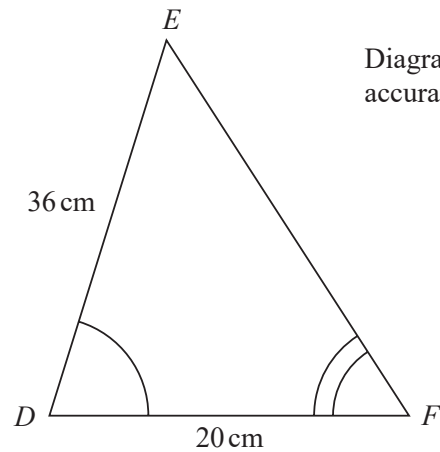
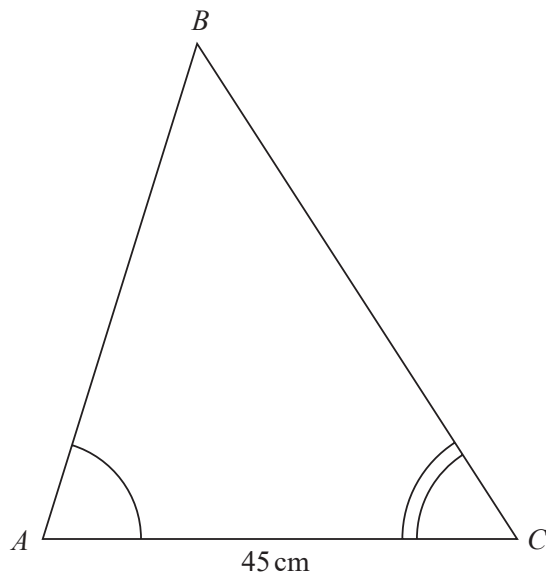


Diagram **NOT**
accurately drawn

(a) Work out the length of AB .

..... cm
(2)

Given that $BC = 54\text{ cm}$,

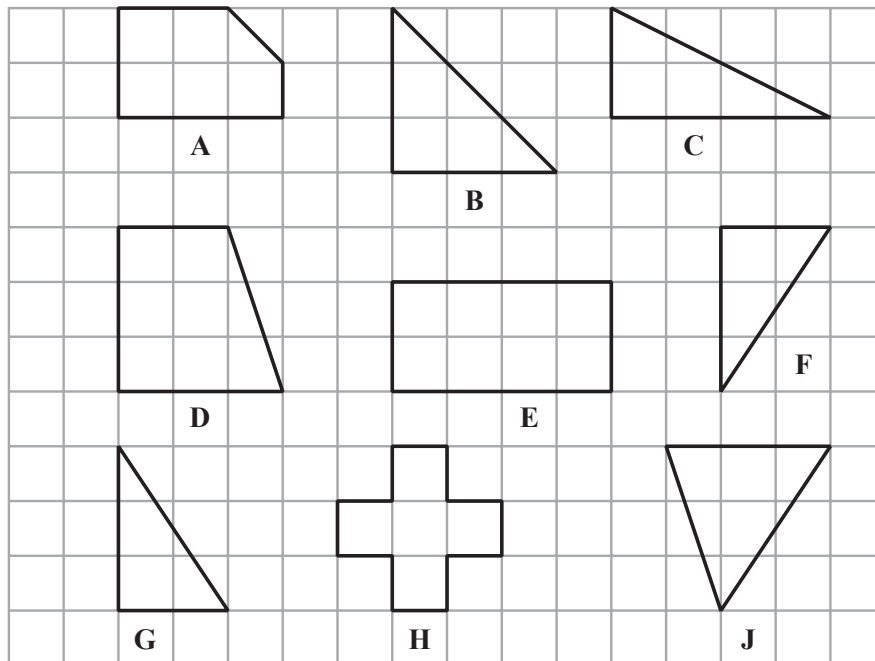
(b) work out the length of EF .

..... cm
(2)

(Total for Question 20 is 4 marks)



6 Here are nine shapes drawn on a grid of squares.



Shape **D** is a quadrilateral.

(a) What is the mathematical name of this quadrilateral?

.....
(1)

One of the shapes is congruent to shape **G**

(b) Write down the letter of this shape.

.....
(1)

(c) Write down the order of rotational symmetry of shape **H**

.....
(1)

(d) How many lines of symmetry has shape **E**?

.....
(1)

(Total for Question 6 is 4 marks)



19 $ABCD$ and $EFGH$ are similar quadrilaterals.

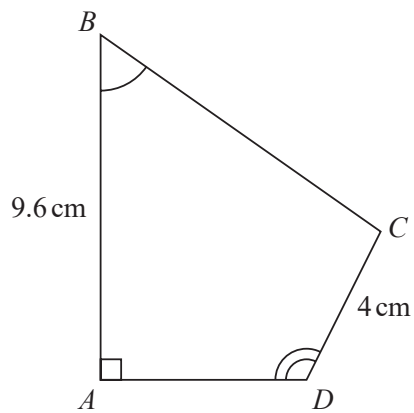
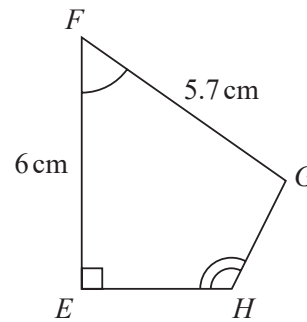


Diagram **NOT**
accurately drawn



(a) Work out the length of GH

..... cm
(2)

(b) Work out the length of BC

..... cm
(2)

(Total for Question 19 is 4 marks)

18 The diagram shows triangle ABC and triangle ECD

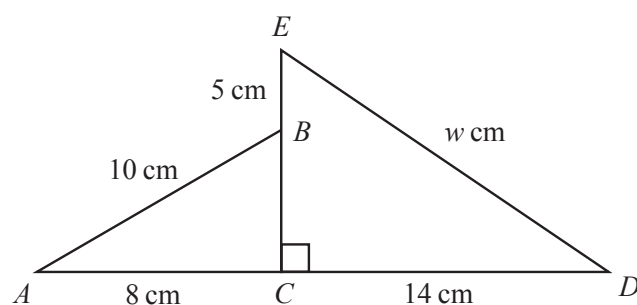


Diagram **NOT**
accurately drawn

ACD and EBC are straight lines.

$$AB = 10 \text{ cm} \quad AC = 8 \text{ cm} \quad EC = 5 \text{ cm} \quad CD = 14 \text{ cm} \quad ED = w \text{ cm}$$

Work out the value of w

Give your answer correct to one decimal place.

$$w = \dots\dots\dots$$

(Total for Question 18 is 4 marks)



22 The diagram shows two similar quadrilaterals, $ABCD$ and $EFGH$

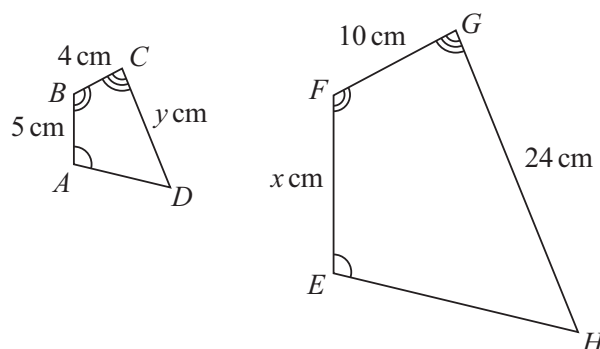


Diagram **NOT**
accurately drawn

$$AB = 5 \text{ cm} \quad BC = 4 \text{ cm} \quad CD = y \text{ cm}$$

$$EF = x \text{ cm} \quad FG = 10 \text{ cm} \quad GH = 24 \text{ cm}$$

(a) Work out the value of x

$$x = \dots\dots\dots (2)$$

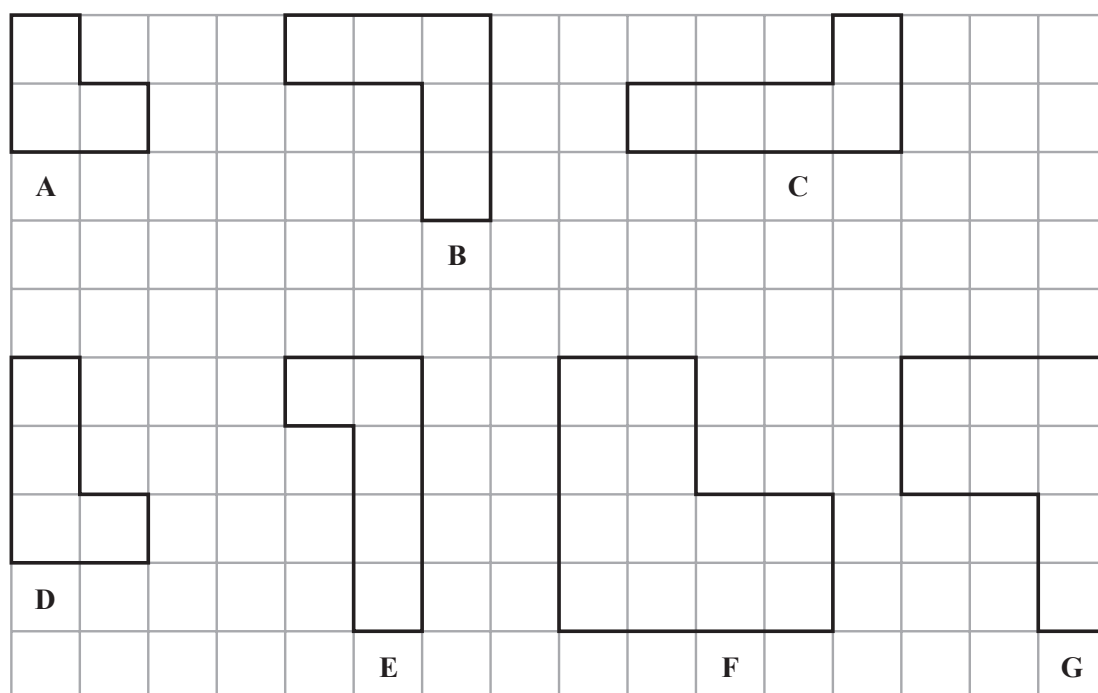
(b) Work out the value of y

$$y = \dots\dots\dots (2)$$

(Total for Question 22 is 4 marks)



2 Here are seven shapes on a centimetre grid.



(a) Write down the letters of the two shapes that are congruent.

..... and
(1)

Two of the seven shapes are similar but are not congruent.

(b) Write down the letters of these two shapes.

..... and
(1)

Shape **F** has exactly one line of symmetry.

(c) On shape **F** on the grid, draw this line of symmetry.

(1)

(d) Work out the perimeter of shape **B**.

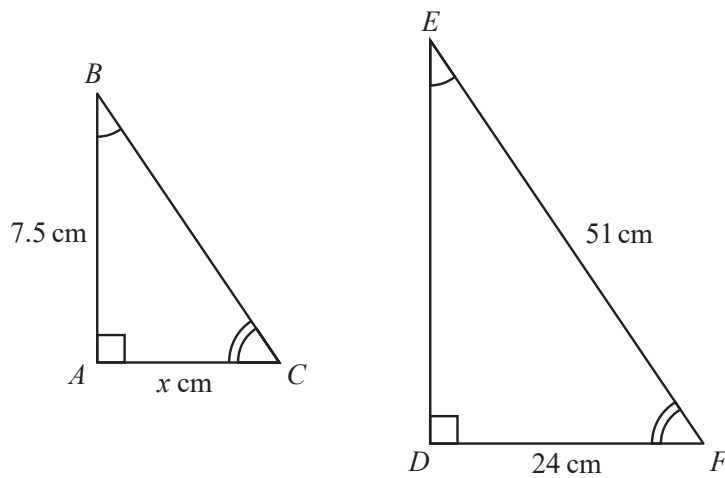
..... cm
(1)

(e) Work out the area of shape **G**.

..... cm²
(1)

(Total for Question 2 is 5 marks)

27 Here are two similar triangles.



Diagrams **NOT**
accurately drawn

Work out the value of x
Show your working clearly.

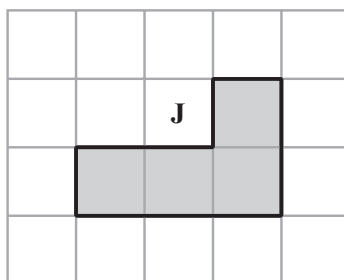
$x =$

(Total for Question 27 is 5 marks)

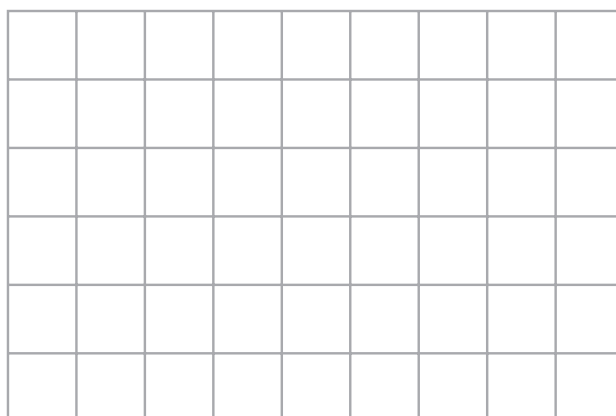
TOTAL FOR PAPER IS 100 MARKS



2

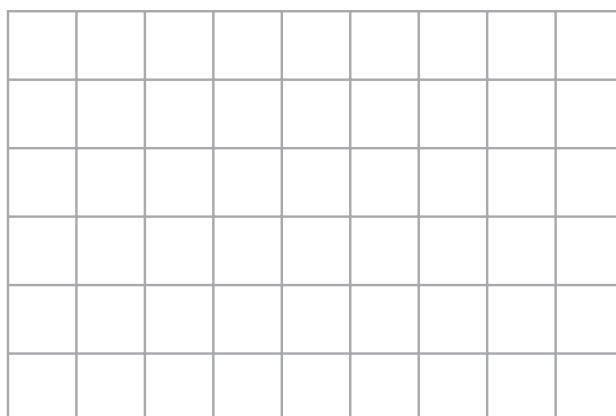


(a) On the grid, draw a shape that is congruent to shape J



(1)

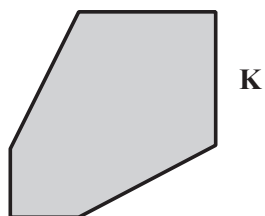
(b) On the grid, draw a shape that is an enlargement of shape J with scale factor 2



(2)

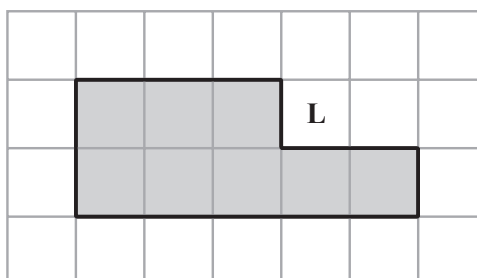
The diagram shows shape **K**
Shape **K** has exactly one line of symmetry.

(c) Draw this line of symmetry on shape **K**



(1)

The diagram shows shape **L** drawn on a centimetre grid.



(d) Work out the perimeter of shape **L**

..... cm
(1)

(e) Work out the area of shape **L**

..... cm²
(1)

(Total for Question 2 is 6 marks)

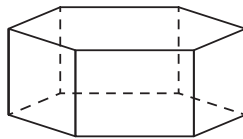
SUB-TOPIC G2c

PLANS, ELEVATIONS & 3D SHAPES

Sub-topic G2c · 1 question · 4 marks · lowest tariff first



- 6 The diagram shows a solid prism.



- (a) How many vertices has the prism?

.....
(1)

- (b) How many faces has the prism?

.....
(1)

- (c) Using ruler and compasses only, in the space below construct the equilateral triangle ABC with sides of length 7 cm.
You must show all your construction lines.

Side AB has already been drawn for you.

A ————— B

(2)

(Total for Question 6 is 4 marks)



MARK SCHEMES

official mark schemes, in the same order as the questions



Question	Working	Answer	Mark	Notes
15		perpendicular bisector drawn	2	M1 Two pairs of relevant arcs drawn or line within guidelines without arcs A1 perpendicular bisector drawn within guidelines and with two pairs of relevant arcs present (overlay needed)
16 (a) (b)	$3 \times 5 + 8 \times 10 + 13 \times 16 + 18 \times 9$ or $15 + 80 + 208 + 162$ or 465 $(3 \times 5 + 8 \times 10 + 13 \times 16 + 18 \times 9) \div 40$ or $(15 + 80 + 208 + 162) \div 40$ or $465 \div 40$	11 – 15	1	B1 M2 $f \times n$ for at least 3 products with correct mid-interval values and intention to add If not M2 then award M1 for n used consistently for at least 3 products within interval and intention to add or at least 3 products with correct mid-interval values with no intention to add M1 dep on M1 NB: accept their 40 if addition shown
		11.625	4	A1 Accept 11.6 or 11.63 or 12 if correct working seen ($465 \div 40$ oe)

Question	Working	Answer	Mark	Notes
10		Correct triangle	2	B 2 For a fully correct triangle or B1 for $BAC = 55^\circ \pm 2^\circ$ or $AC = 7 \text{ cm} \pm 2 \text{ mm}$
11 (a)		$x(3x-1)$	1	B1
(b)		$8y + 12$	1	B1
(c)	$5 \times -3 + 4 \times 6$ or for -15 or $(+)$ 24	9	2	M1 oe
(d)	$3 \times (-4)^2 + 7 \times -4$ or for $(+)$ 48 or for -28	20	2	A1 M1 oe
12	$9 \times 3 (=27)$ or $8 \times 5 (=40)$ or $3 \times 4 (=12)$ or $9 \times 8 (=72)$ or $5 \times 5 (=25)$ or $4 \times 5 (=20)$ $9 \times 3 + 5 \times 5$ or $5 \times 8 + 3 \times 4$ or $9 \times 8 - 5 \times 4 (=52)$ $'52' \div 14 (=3.714....)$ $'4' \times 9.59$	38.36	5	M1 For correct method to find area of a relevant rectangle M1 For a fully correct method to find the area of the floor M1 For a correct method to find number of tins of polish needed M1 Method to find total cost - must be a whole number of tins rounded up A1
13 (a)	$7x - x = -18 - 3$ ($6x = -21$) oe	-3.5	2	M1 Collect terms in 'x' on one side and number terms on the other. A1
(b)	$7w = t - 3$ oe	$w = \frac{t-3}{7}$	2	M1 Isolating term in w
(c)		$T = 2p + 3r$	3	A1 Must have $w =$ B3 For $T = 2p + 3r$ oe (B2 for $2p + 3r$ or $T = 3p + r$ or $T = p + 2r$ or $T = 3p + 2r$) (B1 for $2p + r$ or $p + 3r$ or $3p + 2r$ or $3p + r$ or $p + 2r$)



20	$30 + 4x + 10 + x + 20 (= 5x + 60)$ or $180 - 30 (=150)$		4	M1 Allow $5x + 60 = n$ where $n \neq 180$ or for subtracting 30 from 180	M2 for $5x + 30 = 150$ oe
	e.g. $30 + 4x + 10 + x + 20 = 180$ or $5x + 60 = 180$ oe or $180 - 30 - 10 - 20 (=120)$ oe eg $180 - 60$			M1 for setting up the equation or for subtracting all numerical values of angles from 180	
	$5x = 120$ or " 120 " $\div 5$			M1 dep on M2 for correctly simplifying to $ax = b$ or for dividing " 120 " by 5	
		24		A1 for 24	
Total 4 marks					

21		Fully correct angle bisector with all relevant arcs shown	2	B2 Fully correct angle bisector with all arcs shown. B1 for all arcs and no angle bisector drawn or for a correct angle bisector within guidelines but not arcs or insufficient arcs	
Total 2 marks					



17	e.g. $\frac{15}{4}$		3	M1 for $3\frac{3}{4}$ expressed as an improper fraction
	e.g. $\frac{15^5}{4} \times \frac{7}{9^3}$ OR $\frac{105}{36}$ oe			M1 correct cancelling or multiplication of numerators and denominators without cancelling
	e.g. $\frac{15^5}{4} \times \frac{7}{9^3} = \frac{35}{12} = 2\frac{11}{12}$ or $\frac{15}{4} \times \frac{7}{9} = \frac{105}{36} = \frac{35}{12} = 2\frac{11}{12}$ or $\frac{15}{4} \times \frac{7}{9} = \frac{105}{36} = 2\frac{33}{36} = 2\frac{11}{12}$	shown		A1 dep on M2, for conclusion to $2\frac{11}{12}$ from correct working – either sight of the result of the multiplication e.g. $\frac{105}{36}$ oe must be seen or correct cancelling prior to the multiplication to $\frac{35}{12}$ NB: use of decimals scores no marks
				Total 3 marks
18			2	M1 Arcs on <i>BC</i> , <i>AB</i> and arcs from these points meeting or for bisector without arcs
		Correct bisector		A1 must see correct arcs
				Total 2 marks

Question	Working	Answer	Mark	Notes
9 (a)	$7 - 3$		2	M1 or $3 - 7$
		4		A1
(b)		6	1	B1
(c)	$3 \times 4 + 4 \times 8 + 5 \times 10 + 6 \times 12 + 7 \times 4 (= 194)$ $(12 + 32 + 50 + 72 + 28)$		3	M1 for at least 4 correct products and intention to add. Products may be seen by the side of the table
	"194" $\div$ $(4 + 8 + 10 + 12 + 4)(= 5.105...)$ "194" $\div$ "38"			M1 dep on M1
	<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	5.1		A1 accept 5.1–5.106
				Total 6 marks

Question	Working	Answer	Mark	Notes
10	Line from B at $65^\circ \pm 2^\circ$ or arc from B at $6.2 \text{ cm} \pm 0.2 \text{ cm}$		2	M1
		Correct triangle		A1 SCB1 if no marks scored, award if student has used point A for line and arc, rather than point B
				Total 2 marks

9	$12 \times 9 \times 6$		2	M1
		648		A1 cao
				Total 2 marks

10 (a)		$\frac{5}{29}$	2	B2 for a correct simplified fraction (B1 for $\frac{25}{145}$ oe or for $\frac{29}{5}$)
(b)	$\frac{9}{25} \times 100$ or $\frac{9}{25} = \frac{36}{100}$		2	M1
		36		A1
(c)	$28 \div 16 \times 27$ oe eg 1.75×27 or 1.75×11		2	M1 Fully correct method
		47.25		A1 cao
				Total 6 marks

11		Triangle drawn with correct intersecting arcs from A (5 cm) and B (8 cm)	2	B2 for arcs intersecting within overlay and triangle drawn (B1 for correct 5 cm arc from A or 8 cm arc from B) An accurate triangle drawn without arcs scores B1
				Total 2 marks



9	Allow Triangle drawn with intersecting arcs 6 cm from <i>B</i> and 9 cm from <i>A</i>	Triangle drawn with correct intersecting arcs 6 cm from <i>A</i> and 9 cm from <i>B</i>		B2 for triangle drawn with correct intersecting arcs 6 cm from <i>A</i> and 9 cm from <i>B</i> within the overlay (B1 for two intersecting arcs within the overlay or accurate triangle drawn with no arcs)
				Total 2 marks

10	(i)		$\frac{7}{20}$	1	B1 oe
	(ii)	$\frac{2+6}{20}$ oe or $1 - \frac{5+7}{20}$ oe		2	M1 ft their (i)
			$\frac{8}{20}$		A1 oe penalise incorrect notation only once
					Total 3 marks



11		Correct triangle	2	B2 For a fully correct triangle with arcs shown (B1 for a correctly sized triangle with no arcs shown or for an incorrectly sized triangle with arcs shown where $AC = BC$ or correct arcs not joined) (overlay required)
				Total 2 marks
12	(a)	BL, BM, BS CL, CM, CS DL, DM, DS	2	B2 for all 9 combinations with no extras or repeats (B1 for at least 4 correct combinations (ignoring repeats))
	(b)	$\frac{47}{100}$	1	B1 oe
	(c)	$\frac{49}{53}$	2	B2 oe accept 0.9245... or 92(.45...) % (B1 for $\frac{c}{53}$ where $c < 53$ or $\frac{49}{d}$ where $d > 49$)
				Total 5 marks
13	e.g. $0.5 \times (6 + 13) \times 3$		2	M1 for a complete method
		28.5		A1 oe
				Total 2 marks

17	$6-12x$ or $2-4x = \frac{5}{3} - \frac{8}{3}x$		3	M1 for expansion of bracket on the LHS or dividing the RHS by 3 with two terms
	$6-5=12x-8x$ or $1=4x$ or $-12x+8x=5-6$ oe or $-4x=-1$ or $\frac{8}{3}x-4x=\frac{5}{3}-2$ oe or $2-\frac{5}{3}=-\frac{8}{3}x+4x$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation; number terms on the other
	<i>Working required</i>	$\frac{1}{4}$		A1 oe dep on M1 awarded
				Total 3 marks

18	Two pairs of intersecting arcs with equal radii centre A and B		2	M1 for arcs that intersect within or on the guidelines or correct perpendicular bisector without arcs.
	<i>Working required</i>	Bisector with construction arcs		A1 for a fully correct bisector with two intersecting arcs
				Total 2 marks

3	(a)		554 correctly indicated	1	B1 Arrow or other mark shown clearly at 554 (2nd notch to right of 550)
	(b)		3250	1	B1
					Total 2 marks
4	(a)		line of length 6.5 cm drawn	1	B1 ± 2 mm
	(b)		44	1	B1 Accept answers in the range 42-46 including decimals and fractions
					Total 2 marks



18		Fully correct angle bisector with all relevant arcs shown	2	B2 for a fully correct angle bisector with all relevant arcs shown If not B2 then B1 for all arcs and no angle bisector drawn or for a correct angle bisector within the guidelines but no correct arcs or insufficient correct arcs
				Total 2 marks

19	<table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>10</td><td>7.5</td><td>5</td><td>2.5</td><td>0</td><td>-2.5</td><td>-5</td></tr></table>	x	-2	-1	0	1	2	3	4	y	10	7.5	5	2.5	0	-2.5	-5	Correct line	3	B3 for a correct line between $x = -2$ and $x = 4$ If not B3 then award B2 for a line segment through at least 3 of $(-2, 10), (-1, 7.5), (0, 5), (1, 2.5), (2, 0), (3, -2.5), (4, -5)$ or all points plotted correctly If not B2 then award B1 for at least 2 correct points plotted or stated (may be seen in a table) or for a line drawn with a negative gradient through $(0, 5)$ or for a line with a gradient of -2.5
x	-2	-1	0	1	2	3	4													
y	10	7.5	5	2.5	0	-2.5	-5													
				Total 3 marks																

8	$26 \times 14 (= 364)$ or $26 \times 15 (= 390)$ or $14 \times 15 (= 210)$ or $\frac{3}{4} \times 26 (= 19.5)$ or $\frac{3}{4} \times 14 (= 10.5)$ or $\frac{3}{4} \times 15 (= 11.25)$ oe		3	M1 For multiplying 2 of the 4 numbers 26, 14, 15, $\frac{3}{4}$ oe
	3 of 26, 14, 15, $\frac{3}{4}$ oe seen multiplied together			M1 For multiplying 3 of the 4 numbers (multiplication must be seen) – could be done in separate sums
	Correct answer scores full marks (unless from obvious incorrect working)	4095		A1
				Total 3 marks

9		Correct triangle	2	B2 Correct triangle within tolerance If not B2, then B1 for CB of length 6.5 cm or angle $ACB = 38^\circ$ Allow CB length 6.3 cm to 6.7 cm and angle $ACB = 36^\circ$ to 40°
				Total 2 marks



9		Triangle drawn with correct intersecting arcs 9 cm from A and 9 cm from B	2	B2 for triangle drawn with correct intersecting arcs 9 cm from A and 9 cm from B within or on the guidelines of the overlay (B1 for two intersecting arcs within or on the guidelines of the overlay or accurate triangle drawn with no arcs)
	Working required			Total 2 marks

10	(a)		$\frac{10}{29}$	1	B1 oe 0.34(48275...) or 34.(48275...) % truncated or rounded
	(b)	$\frac{29-10-7}{29}$ or $1 - \frac{10+7}{29}$ or $29 - 10 - 7$ or 12 or $1 - 0.34(482...) - 0.24(137...)$		2	M1
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$\frac{12}{29}$		A1 oe 0.41(37931...) – 0.42 or 41.(37931...) % – 42% penalise incorrect notation only once
					Total 3 marks

9	(a)		c^3	1	B1
	(b)		$36de$	1	B1 oe
	(c)		28	1	B1
	(d)	$2g = 6 + 3$ or $2g = 9$ or $g - \frac{3}{2} = \frac{6}{2}$ oe or $(6 + 3) \div 2$ or $9 \div 2$		2	M1
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	4.5		A1 oe eg $\frac{9}{2}$ or $4\frac{1}{2}$ or 4,5
	(e)		$x^2 - 4x$	1	B1 or $-4x + x^2$
	(f)	e.g. $4 \times (-3)^2 + 2$ or $4(-3)^2 + 2$ or $4 \times 9 + 2$ or $4(9) + 2$ or $4 \times -3 \times -3 + 2$ or $4(-3 \times -3) + 2$		2	M1 for substituting values for y and w
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	38		A1
					Total 8 marks
10			Correct square	2	B2 For a fully correct square with arcs shown (B1 for a correctly sized square with no arcs shown or for an incorrect quadrilateral with arcs of equal radius shown or correct arcs not joined – all within or on the guidelines of the overlay
					Total 2 marks

19		Fully correct angle bisector with all relevant arcs	2	B2 for a fully correct angle bisector with all arcs shown (the line and the arcs can intersect on or within the overlay guidelines) (B1 for all arcs and no angle bisector drawn or for a correct angle bisector within or on guidelines but no arcs or insufficient arcs) NB Overlay is available
				Total 2 marks



Question	Working	Answer	Mark	Notes
21*		Bisector with construction arcs	2	B2 B2 for a fully correct perpendicular bisector with 2 pairs of intersecting arcs shown (the line and the arcs can intersect on or within the overlay guidelines) (B1 for 2 pairs of intersecting arcs and no perpendicular bisector drawn or for a correct perpendicular bisector drawn within or on guidelines but no arcs or insufficient arcs or one pair of intersecting arcs and perpendicular bisector drawn on just one side of AB) NB Overlay is available
				Total 2 marks



Question	Working	Answer	Mark	Notes
20	$30.5 \div 8 (= 3.8125)$ OR $60 \div 8 (= 7.5)$ $"3.8125" \times 60$ OR $30.5 \times "7.5"$	228.75	3	M1 M2 for $30.5 \div \frac{8}{60}$ oe M1 A1 accept 229, 228.8
21	$3x + 10 = x + 52$ $3x - x = 52 - 10$ or $2x = 42$ or $x = 21$ $y = 180 - 2 \times ("21" + 52)$ or $y = 180 - 2 \times (3 \times "21" + 10)$ or $y = 180 - ("21" + 52) - (3 \times "21" + 10)$	34	4	M1 for equating the expressions for angle <i>P</i> and angle <i>Q</i> M1 for isolating the terms in <i>x</i> M1 for a complete method A1 dep on M2
22	eg $\frac{187}{147}$ or $\frac{147}{187}$ or $\frac{90}{187}$ or $\frac{187}{90}$ eg $90 \div \frac{187}{147}$ or $90 \times \frac{147}{187}$ or $147 \times \frac{90}{187}$ or $147 \div \frac{187}{90}$	71	3	M1 for an appropriate scale factor, candidates may work in either cm or m M1 for a complete method, candidates may work in either cm or m A1 70.7 – 71



10	$[5.8, 6.2] \times 1.5$ (= [8.7, 9.3])	$[5.8, 6.2] \times 18$ (= [104.4, 111.6])		3	M1	M2 for $[5.8, 6.2] \times 27$
	$“[8.7, 9.3]” \times 18$ (= [156.6, 167.4]) or their value $\times 18$	$“[104.4, 111.6]” \times 1.5$ (= [156.6, 167.4]) or their value $\times 1.5$			M1 Do not allow 18×1.5 oe on its own	
	Correct answer scores full marks (unless from obvious incorrect working)		162		A1 allow [156.6, 167.4] Ignore attempts at conversions from minutes to hours/minutes or seconds	
					Total 3 marks	

11	$c - 5 = 8d$ oe or $-8d = -c + 5$ or $\frac{c}{8} = d + \frac{5}{8}$ oe or $\frac{c - 5}{8}$ oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	$d = \frac{c - 5}{8}$		A1 accept $d = \frac{c}{8} - \frac{5}{8}$ oe or $d = \frac{5 - c}{-8}$ oe (must see $d = \dots$ on answer line or in working)
				Total 2 marks



			$\frac{11}{4}$	3	A1 dep on M1 accept 2.75 or $2\frac{3}{4}$ oe Award full marks for a correct answer if at least 1 method mark awarded If no correct algebraic working then award no marks
					Total 8 marks
10	(a)		Triangle drawn with correct intersecting arcs 7 cm from A and 7 cm from B	2	B2 for triangle drawn with correct intersecting arcs 7 cm from A and 7 cm from B within the overlay (B1 for two intersecting arcs within the overlay or accurate triangle drawn with no arcs)
	(b)	Two pairs of intersecting arcs with equal radius centre D and E			M1 for arcs that intersect within guidelines or correct perpendicular bisector without arcs.
			Correct bisector with arcs	2	A1
					Total 4 marks

8	[6, 6.4]		4	M1 accept in the range 6 – 6.4
	"[6, 6.4]" $\times$ 80 (= [480, 512])			M1
	590 – "[480, 512]" (= [110, 78])			M1
	<i>Working required</i>	78 – 110		A1 dep on M1
				Total 4 marks

8 ALT	[6, 6.4]		4	M1 accept in the range 6 – 6.4
	$(590 \div 80) - "[6, 6.4]" (= [0.975, 1.375])$ or $7.375 - "[6, 6.4]" (= [0.975, 1.375])$			M1
	"[0.975, 1.375]" $\times$ 80 (= [78, 110])			M1
	<i>Working required</i>	78 – 110		A1 dep on M1
				Total 4 marks



12	(a)	[8.8, 9.2] × 5000 (= [44 000, 46 000]) or 5000 ÷ 1000 (= 5) or any seen value ÷ 1000		3	M1 for measuring the line (±0.2cm tolerance, 8.8 cm to 9.2 cm) and using the scale or for an attempt to convert a value into kilometres Do not allow any seen value ÷ 1000 if clearly linked to the wrong unit, eg mm
		["44 000", "46 000"] ÷ 1000 or [8.8, 9.2] × "5"			M1 for use of scale and conversion
		Correct answer scores full marks (unless from obvious incorrect working)	45		A1 allow 44 – 46, must agree with their measurement
	(b)		4 (hours) 25 (minutes)	2	B2 for 4 (hours) and 25 (minutes) (B1 for 4 (hours) or 25 (minutes))
					Total 5 marks

Question	Working	Answer	Mark	Notes
20	$\frac{20}{8}$ oe or 2.5 oe or $\frac{8}{20}$ oe or 0.4 oe			M1 for a correct scale factor
	Eg $6.4 \times \frac{20}{8} + 6.4$ or $CE = 6.4 \div \frac{8}{20} + 6.4$			M1 for a complete method to find <i>BE</i>
		22.4	3	A1



4	(a)		12	1	B1
	(b)	'12' $\times$ 2.5	30	1	B1ft Ft their 12
	(c)	One and a quarter rectangles	One and a quarter rectangles drawn oe	1	B1 ft their 12
	(d)	36×5000 (= 180 000) or $200\,000 \div 5000$ (=40)		2	M1
			No and 180 000		A1 for no oe and 180 000 or no oe and 40 or no oe and 20 000 short or 20 000 and short/off
Total 5 marks					

5	(a)		$10ab$	1	B1
	(b)		4	1	B1
Total 2 marks					

6	(a)		cuboid	1	B1 Accept rectangular cuboid or rectangular prism. Do not accept cube
	(b)		6.5	1	B1 Accept 6.4 – 6.6
	(c)		A and F	1	B1 May be stated or could be circled in list
Total 3 marks					



8	(a)	$2 + 4 + 6 + 5$		2	M1
			17		A1
	(b)	$8 + 5 + 6$		2	M1
			19		A1
	(c)	$3 + 4 + 2 + 5$		2	M1
			14		A1
					If no marks awarded, SC B1 for $6 + 4 + 2 + 2 + 1 (=15)$
					Total 6 marks

9	$(0.5 \times 4 \times 6) - (0.5 \times 2 \times 3)$		3	M2	if not M2 then M1 for either $0.5 \times 4 \times 6 (=12)$ or $0.5 \times 2 \times 3 (=3)$
	or $2 \times 3 + 0.5 \times 2 \times 3$				if not M2 then M1 for either area of 1 large parallelogram (2×3) or 1 triangle ($0.5 \times 3 \times 2$)
	or $(0.5 \times 4 \times 6) - (0.25 \times "0.5 \times 4 \times 6")$ oe				Allow M1 for consistent use of incorrect side lengths, eg $0.5 \times 5 \times 7$
		9		A1	
					Total 3 marks

18	(a)	$\frac{12}{4}(=3)$ or $\frac{4}{12}(=0.\dot{3})$ or $\frac{BC}{4} = \frac{16.5}{12}$ or $BC \div 16.5 = 4 \div 12$ or $(BC =) 16.5 \div \frac{12}{4}$		2	M1 correct scale factor (given as 3 or a fraction or a ratio) or correct equation using BC or a correct expression for BC
			5.5		A1
	(b)		$3x$	1	B1 allow $3 \times x$ or $x \times 3$ ft their “3” in (a)
					Total 3 marks

19	(a)		17.75	1	B1 oe
	(b)		18.25	1	B1 oe 18.249 (allow 18.2499...)
					SC B1 for 17.5 in (a) and 18.5 (or 18.49) in (b)
					Total 2 marks

20	(a)	$700 \div 200 (= 3.5)$		3	M1 or 3.5 shown on diagram – within bounds of overlay
					M1 for line drawn at correct angle $\pm 2^\circ$ within bounds of overlay
			C indicated in correct position		A1 for C drawn within bounds of overlay, inclusive of lines
	(b)		(1 :) 20 000	1	B1
					Total 4 marks



17	(a)	$\frac{15}{6}$ or $\frac{6}{15}$ or $\frac{4.2}{6}$ or $\frac{6}{4.2}$ oe 2.5 or 0.4 or 0.7 or 1.4(2857.....)			M1 for a correct scale factor, accept ratio notation eg 6 : 15
			10.5	2	A1 oe
	(b)	$19.5 \div 2.5$ or 19.5×0.4 oe or $4.2 \times \frac{19.5}{(a)}$			M1 If using <i>DF</i> ft their answer from part (a)
			7.8	2	A1 oe
					Total 4 marks

18		e.g. $30 \times 26.8 (= 804)$ or $13 \times 25 (= 325)$ or $(26.8 - 25) \times 30$ or 1.8×30			M1 for finding the total marks for the boys or the total test marks
		e.g. $(30 \times 26.8 - 13 \times 25) \div (30 - 13)$ (= 28.1764...) or (('804' - '325') $\div$ (30 - 13) (= 28.1764...) or (('804' - '325' $\div$ 17) (= 28.1764...) or $((26.8 - 25) \times 30) \div 17 + 25$ (= 28.1764...) or '1.8' $\times$ 30 $\div$ 17 + 25 (= 28.1764...)			M1 for a complete method to find the mean mark for the girls
			28.2	3	A1 accept 28.15 - 28.2 (accept without working) (Accept 28 from complete working)
					Total 3 marks

						Total 3 marks
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Question		Working	Answer	Mark		Notes
19	(a)		-5, 5, 5, -5	2	B2	All 4 correct values If not B2 then B1 for 2 or 3 correct values
	(b)		Fully correct curve	2	M1 A1	Plotting at least 6 points correctly from their table dep on B1 in part(a) Do not accept horizontal line at top of curve or straight line segments
Total 4 marks						

20	(a)	$40 \div 16 \times 12$	30	2	M1 A1	$40 \times \frac{12}{16}$ oe
	(b)	$525 \div 100^2$	0.0525 oe	2	M1 A1	
Total 4 marks						

21		P(mint =) $1 - (0.35 + 0.32 + 0.12)$ (= 0.21) P(strawberry or mint =) $0.32 + "0.21"$	0.53 oe	3	M1 M1 A1	Or a correct equation summing to 1 Dep Allow 0.53/1
Total 3 marks						

22		$55 \div (6 + 3 + 2)$ (= 5) $(6 \times "5") - (2 \times "5")$	20	3	M1 M1 A1	or $\frac{6}{11} \times 55$ or $\frac{2}{11} \times 55$ or M2 for Won = 30 and Lost = 10
Total 3 marks						

3	(a)		A and D	1	B1
	(b)		Correctly enlarged shape	2	B2 A correctly drawn shape (B1 for a shape with 3 sides correctly enlarged)
	(c)		hexagon	1	B1 Condone incorrect spelling if meaning is unambiguous
Total 4 marks					
4	(a)		evens	1	B1
	(b)		Cross at 0	1	B1
	(c)		Cross at the 2 nd mark along	1	B1 ie the mark before $\frac{1}{2}$
	(d)		Cross at the 4 th mark along	1	B1 ie the mark after $\frac{1}{2}$
Total 4 marks					
5	(a)		$3w$	1	B1
	(b)		$8a$	1	B1
	(c)		f^5	1	B1
	(d)		$9c - 2h$	2	B2 (B1 for one correct term)
	(e)		$5(2d + 3)$	1	B1
	(f)	$e - g = 7t$ or $\frac{e}{7} = t + \frac{g}{7}$ oe		2	M1
			$t = \frac{e - g}{7}$		A1 oe e.g. $(e - g) \div 7$
Total 8 marks					
6		$30 \div 3.05 (= 9.8...)$		3	M1 oe, e.g. adding 9 lots of 3.05
		$30 - 9 \times 3.05$ oe			M1
			2.55		A1 oe
					Total 3 marks

20	(a)	$\frac{45}{20}$ or $\frac{20}{45}$ or $\frac{36}{20}$ or $\frac{20}{36}$ oe 2.25 or 0.44(44...) or 1.8 or 0.55(55...)		2	M1 for a correct scale factor, accept ratio notation eg 45 : 20
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	81		A1
	(b)	$54 \div 2.25$ or $54 \times 0.44(44...)$ oe or $36 \times \frac{54}{81}$		2	M1 can fit if M1 scored in (a)
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	24		A1
					Total 4 marks



4	(a)		Qatar	1	B1
	(b)		9	1	B1 allow -9
	(c)		-4	1	B1
Total 3 marks					
5	(a)		Correct line	1	B1 line drawn at $y = -2$
	(b)		$(-1, 2)$	2	B2 for both coordinates correct If not B2, then B1 for one correct coordinate or $(2, -1)$
	(c)		$(d =) 1$	1	B1 accept $(5, 1)$
Total 4 marks					
6	(a)		Trapezium	1	B1
	(b)		F	1	B1
	(c)		4	1	B1 or "four"
	(d)		2	1	B1 or "two"
Total 4 marks					
7	$\frac{3}{8} \times \frac{5}{6}$ oe eg $0.375 \div 6 \times 5$ Allow $0.375 \times 0.83 \dots$ oe		eg $\frac{3}{8} \times 48 = 18$ and eg $\frac{5}{6} \times 18 = 15$	3	M1 for showing intention to multiply the two given fractions or using a number of members that is a multiple of 48 to work out the number of right-handed children.
	eg $\frac{3}{8} \times \frac{5}{6} = \frac{15}{48}$ or $\frac{3}{8} \times \frac{5}{6} = \frac{15}{48}$ $0.375 \times 0.83 \dots = 0.31 \dots$		"15" "48"		M1 For an attempt to multiply fractions or Dividing their 15 by their 48
			$\frac{5}{16}$		A1 dep on M1
	Total 3 marks				

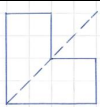
19 (a)	eg $\frac{9.6}{6}$ (= 1.6 oe) or $\frac{6}{9.6}$ (= 0.625 oe) or $\frac{("GH")}{6} = \frac{4}{9.6}$ oe		2	M1 for a correct scale factor accept ratio notation eg 9.6 : 6 (can be seen near the diagram)
	Correct answer scores full marks (unless from obvious incorrect working)	2.5		A1 oe allow 2,5
(b)	eg $5.7 \times "1.6"$ or $5.7 \div "0.625"$ or $5.7 \times \frac{4}{"2.5"}$ or $5.7 \div \frac{"2.5"}{4}$ or $\frac{("BC")}{9.6} = \frac{5.7}{6}$		2	M1 ft their scale factor from (a)
	Correct answer scores full marks (unless from obvious incorrect working)	9.12		A1 oe ft their scale factor from (a) allow 9,12
Total 4 marks				

Question	Working	Answer	Mark	Notes
18	$10^2 - 8^2 (=36)$ or $8^2 + BC^2 = 10^2$ oe or $\cos BAC = \frac{8}{10}$ ($BAC = 36.869\dots$)		4	M1
	$\sqrt{10^2 - 8^2} (=6)$ or $\tan^{-1} \frac{6}{8} (=36.869\dots)$ or $\sin^{-1} \frac{6}{10} (=36.869\dots)$			M1 (beware that $14 - 8 = 6$ has been seen and scores zero)
	$w = \sqrt{(5 + 6)^2 + 14^2} (= \sqrt{317})$ or $EDC = \tan^{-1} \left(\frac{5 + 6}{14} \right) (= 38.157)$ and $w = \frac{11}{\sin 38.157\dots}$ or $w = \frac{14}{\cos 38.157\dots}$ or $CED = \tan^{-1} \left(\frac{14}{11} \right) (= 51.84\dots)$ and $w = \frac{11}{\cos 51.84\dots}$ or $w = \frac{14}{\sin 51.84\dots}$			M1ft Allow use of <i>their</i> value of <i>BC</i>
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	17.8		A1 awrt 17.8 if no other marks scored then SCB1 for 22.6(5...)
				Total 4 marks

WATCH OUT FOR $\sqrt{10^2 + 8^2} (=12.8\dots) + 5 = 17.8$ (which is the same as the answer....but a completely wrong method)

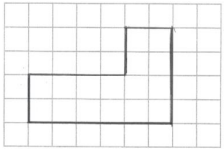
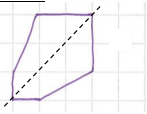


Question	Working	Answer	Mark	Notes
22* (a)	$\frac{10}{4} \left(= \frac{5}{2} = 2.5 \right)$ or $\frac{4}{10} \left(= \frac{2}{5} = 0.4 \right)$ or $\frac{x}{5} = \frac{10}{4}$ oe or $\frac{x}{10} = \frac{5}{4}$ oe		2	M1 for a correct SF can be expressed as a fraction, decimal or ratio (may or may not be used) or for a correct equation in x Allow any letter for x
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	12.5		A1 oe eg $\frac{50}{4}$ or $\frac{25}{2}$ or $12\frac{1}{2}$ or $12\frac{2}{4}$
(b)	$24 \div [2.5]$ oe or $\frac{y}{24} = \frac{4}{10}$ oe or $\frac{y}{24} = \frac{5}{[12.5]}$ oe or $\frac{y}{4} = \frac{24}{10}$ oe or $\frac{y}{5} = \frac{24}{[12.5]}$ oe		2	M1 ft ie [2.5] is their SF from (a) or for a correct equation in y Allow any letter for y ft their answer to (a) ie [12.5] is their answer to (a)
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	9.6		A1 oe eg $\frac{48}{5}$ or $9\frac{3}{5}$ If (a) x = 9.6 and (b) y = 12.5 then M1A0M1A0
				Total 4 marks

International GCSE Maths				
Apart from questions 20 and 26 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	Working	Answer	Mark	Notes
1 (a)		30	1	B1
(b)		0.29	1	B1
(c)		0.85	1	B1
(d)		-9, -7, -3, 8, 16	1	B1
(e)		0.009, 0.04, 0.044, 0.104, 0.2	1	B1 extra zeros at the end are fine and the numbers may be separated by any signs eg < or , etc
(f)	$1 - \frac{3}{10} (= \frac{7}{10})$ oe or $\frac{3}{10} \times 400 (= 120)$ oe		2	M1 or use of $\frac{7}{10}$ eg $\frac{400}{10} \times 7$
		280		A1 Cao
				Total 7 marks
2 (a)		C, E	1	B1 accept E and C as order does not matter
(b)		A, F	1	B1 accept F and A as order does not matter
(c)		Correct line	1	B1 correct line with no other lines
(d)		12	1	B1
(e)		8	1	B1
				Total 5 marks

27	eg $51^2 = (DE)^2 + 24^2$ oe or $2601 = (DE)^2 + 576$ oe or $(DE^2 =) 51^2 - 24^2 (= 2025)$ oe or $(DE^2 =) 2601 - 576 (= 2025)$ oe or $\cos(DFE) = \frac{24}{51}$ or $\sin(DEF) = \frac{24}{51}$	5	M1 for applying Pythagoras theorem correctly
	$(DE =) \sqrt{51^2 - 24^2} (= \sqrt{2025} = 45)$ or $(DE =) \sqrt{2601 - 576} (= \sqrt{2025} = 45)$ or $(DFE =) \cos^{-1}\left(\frac{24}{51}\right) (= 61.9\dots)$ or $(DEF =) \sin^{-1}\left(\frac{24}{51}\right) (= 28.0\dots)$		M1 for square rooting
	$\frac{\text{their } DE}{7.5} (= 6)$ oe or $\frac{7.5}{\text{their } DE} \left(= \frac{1}{6}\right)$ or $\frac{x}{24} = \frac{7.5}{\text{their } DE}$ oe or $\tan \text{"their } 61.9\dots" = \frac{7.5}{(x)}$ or $\tan \text{"their } 28.0\dots" = \frac{(x)}{7.5}$ or $\frac{(x)}{\sin(\text{their } 28.0)} = \frac{7.5}{\sin(\text{their } 61.9)}$ NB Their <i>ED</i> or their 61.9 or their 28.0 must be clearly identified Their 61.9.. or their 28.0.. cannot be used as lengths of the triangle Their 45 cannot be used as an angle of the triangle		M1 for a correct method to find the scale factor Allow correct use of sine rule/cosine rule/Pythagoras theorem Allow 0.17 or better for $\frac{1}{6}$ Special case Allow $(DE =) \sqrt{51^2 + 24^2}$ $(= \sqrt{3177} = 3\sqrt{353} = 56.3\dots)$ for "45" for this mark
	$24 \div "6"$ oe or $24 \times " \frac{1}{6} "$ or $24 \times "1.67"$ or $(x =) \frac{7.5}{\text{their } ED} \times 24$ or $(x =) \frac{7.5}{\tan \text{"their } 61.9\dots"}$ oe or $(x =) 7.5 \times \tan \text{"their } 28.0\dots"$ oe or $(x =) \frac{7.5}{\sin(\text{their } 61.9)} \times \sin(\text{their } 28.0)$ oe or $51 \times " \frac{1}{6} " (= 8.5)$ and $(x =) \sqrt{8.5^2 - 7.5^2} (= \sqrt{16})$		M1 dep on previous M1 for a correct method to find <i>x</i> or for finding <i>BC</i> and using Pythagoras theorem to find <i>x</i> Allow $24 \times " \frac{7.5}{56(.3\dots)} "$ or $24 \div " \frac{56(.3\dots)}{7.5} "$ for scale factor for this mark
	Working required	4	A1 dep on M2 The value of 4 must come from correct figures
Total 5 marks			



2	(a)		Correct congruent shape	1	B1 A shape of the same size and shape as given (can be reflected or rotated)
	(b)	eg 	Correct enlargement	2	B2 A shape that is an enlargement of the given shape (B1 for 2 correctly enlarged sides) Any orientation is satisfactory
	(c)		correct line	1	B1 correct line with no other lines
	(d)		14	1	B1
	(e)		8	1	B1
					Total 6 marks



5	(a)		13	1	B1
	(b)	$160 \times 2 (=320)$ or “ 160×2 ” – 5 or “ $160 \times 2 - 5$ ” $\div 3$	105	2	M1 One correct inverse operation used
				A1	
	(c)		$P = \frac{3n+5}{2}$	2	B2 oe (B1 for $\frac{3n+5}{2}$ oe or $P = 3n + 5 \div 2$ or for $P =$ a formula including n with 2 operations correct eg $P = 3n + 5$ or for $n = \frac{2P-5}{3}$ or $P = \frac{2n-5}{3}$)
					Total 5 marks

6	(a)		12	1	B1
	(b)		8	1	B1
	(c)	Two intersecting arcs with equal radius		2	M1 For arcs that intersect within guidelines or correct equilateral triangle drawn without arcs
			Correct equilateral triangle with arcs		A1
Total 4 marks					

