

This test is divided into non-calculator (20 minutes) and calculator (30 minutes) sections which can be delivered separately.

The following marks are awarded for each question.

B	Unconditional accuracy mark
M	Method mark – the correct method must be shown but there may be an arithmetic error; the sight of the value given in brackets implies the award of the method mark
A	Accuracy mark – unless the question specifies that working must be shown then the sight of the correct answer implies the award of full marks (unless the answer clearly comes from incorrect working)
C	Communication mark
P	Process mark to show correct process for problem solving. Any other process of a similar standard to achieve an accurate result is acceptable to achieve this mark
FT	Incorrect values may be followed through from one step to the next provided that the correct method is seen in each step and the only errors are arithmetic. This is shown in mark schemes by putting a number in inverted commas.
OE	Or equivalent answer mark

Non-Calculator			
Q	Answer	Mark	Comment
1	Explanation with appropriate angles and reasons	P1	angle $BCA = 30^\circ$ and angle $XYZ = 130^\circ$ OE, e.g. angle $BCA = 30$ and angle $YXZ = 35$, so these are not equal or angle $XYZ = 130$ and angle $ABC = 135$ so these are not equal
		C1	similar triangles must have identical angles, so the two triangles are not similar
3	14 (cm)	M1	$21 \div 6 (= 3.5 \text{ OE})$ or $4 \times 3.5 \text{ OE}$ or uses ratio of width to length 2:3
		A1	14

5a	Explanations	C1	angle $QPR = \text{angle } RTS$ <u>alternate</u> angles are <u>equal</u> and Angle $PQR = \text{angle } RST$ <u>alternate</u> angles are <u>equal</u> ; accept "same" instead of "equal" OE
		C1	angle $PRQ = \text{angle } SRT$ <u>vertically opposite</u> angles are <u>equal</u> so PQR and RST are similar triangles; accept "same" instead of "equal" OE
5b	$a = 36(\text{cm})$ and $b = 5(\text{cm})$	M1	Scale factor = $\frac{27}{6}$ (= 4.5 OE)
		A1	$a = 36$ and $b = 5$

7	Full proof	C3	<p>e.g. $XWM = MYZ$ and $WXM = MZY$ because <u>alternate</u> angles are <u>equal</u></p> <p>$WX = YZ$ because <u>opposite sides</u> of a parallelogram are <u>equal</u></p> <p>and reference to ASA</p> <p>C2 for identifying any two of $XWM = MYZ$, $WXM = MZY$ or $WX = YZ$ with correct reasons or all three with one correct reason</p> <p>C1 for identifying any one of $XWM = MYZ$, $WXM = MZY$ or $WX = YZ$ with a correct reason or all three with no correct reason</p>
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 Calculator			
9	No with comparison of two correct figures, e.g. $1\frac{2}{3}$ and 2	M1	dimensions of WXYZ are $18 + 6 + 6 (= 30)$ and $12 + 6 + 6 (= 24)$
		M1	length scale factor = $30 \div 18 (= 1\frac{2}{3}$ OE) and width scale factor = $24 \div 12 (= 2)$ or for correct use of a scale factor to find a length eg width scale factor is 2, so for the length $18 \times 2 = 36$
		C1	
11a	7(cm)	M1	scale factor = $10.5 \div 6 (= 1.75$ OE) or 4×1.75 OE
		A1	7
11b	8.4 (cm)	M1	$14.7 \div "1.75"$ OE
		A1	8.4

13	583.78 (cm ²)	P1	volume scale factor of X to Y = $\frac{638.69}{130} = 4.913$ OE
		P1	linear scale factor = $\sqrt[3]{4.913} = 1.7$ OE
		P1	area scale factor = $1.7^2 = 2.89$ OE or 202×2.89
		A1	
15	$\frac{x^2 - 4}{3(x - 2)}$ $\frac{(x + 2)}{3}$ $(A=)9 \times \left(\frac{x + 2}{3}\right)^2 = x^2 + 4x + 4$	C1	for an expression of the length scale factor, e.g. $\frac{x^2 - 4}{3(x - 2)}$ OE
		C1	for simplifying the length scale factor, e.g. $\frac{(x - 2)(x + 2)}{3(x - 2)}$ or $\frac{(x + 2)}{3}$ OE
		C1	for an expression using the area scale factor, e.g. $9 \times \left(\frac{x + 2}{3}\right)^2 = x^2 + 4x + 4$ OE
		C1	fully correct process

Non-Calculator			
Question	Topic	Step	Marks
1	Use the information given about the length of sides and sizes of angles to determine whether triangles are congruent, or similar	7th	2
3	Use the scale factor of similar shapes to find missing lengths where the scale factor is a fraction	7th	2
5a	Use similar shapes to work out missing lengths	9th	2
5b	Use similarity to solve problems in 2D shapes	8th	2
7	Prove using angle facts on parallel lines if two triangles are congruent	9th	3

 Calculator			
Question	Topic	Step	Mark
9	Use similarity to solve problems in 2D shapes	9th	3
11a	Use the scale factor of similar shapes to find missing lengths where the scale factor is a fraction	7th	2
11b	Use the scale factor of similar shapes to find missing lengths where the scale factor is a fraction	7th	2
13	Solve problems involving areas and volumes of similar shapes and solids	12th	4
15	Solve problems involving areas and volumes of similar shapes and solids	12th	4

