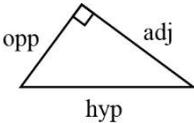


The following marks are awarded for each question.

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

Q	Answer	Mark	Comment
1		B1	
3	12.5 (cm)	P1	for $\sqrt{6^2 + 11^2}$ OE, e.g. $\sqrt{157}$
		A1	accept 12.5 to 12.6
5	14.1 (cm)	P1	$\cos 70 = RT \div 41.2$ OE
		A1	accept 14.09 to 14.1

7	5.2 (cm)	P1	for $\sqrt{6^2 - 3^2}$ OE, e.g. $\sqrt{27}$
		A1	accept 5.1 to 5.2
9	4.47 (km)	P1	for use of lengths 4 or 2
		P1	for $4^2 + 2^2 (= 20)$
		P1	dep on M1 for $\sqrt{20}$
		A1	accept 4.47 to 4.48

11	30.7	C1	for identification that the angle of elevation is x (may be implied)
		P1	for $\tan x = 3.8 \div 6.4 (= 0.59375)$
		A1	accept 30.6 to 30.7
13	46	P1	for $\sin \theta = 10 \div 14$ OE, e.g. $\sin \theta = 0.714\dots$
		A1	accept 45.5 to 46
15	No, with at least two angles calculated correctly OR No, with at least two pairs of sides shown to be in a different ratios	P1	for process to work out one angle in triangle ABC eg $\tan A = 4.2 \div 8$ OR for process to work out AC or PQ using Pythagoras, e.g. $AC = \sqrt{(8^2 + 4.2^2)}$ or $PQ = \sqrt{(10^2 - 5^2)}$
		A1	for one correct angle in triangle ABC , e.g. $A = 27(699\dots)$ or $AC = 9.03\dots$ (or 9.04) or $PQ = 8.66\dots$
		P1	for process to work out one angle in triangle PQR , e.g. $\sin P = 5 \div 10$, or process to work out an equivalent pair of ratios, e.g. $9.04 \div 10 = 0.904$ and $4.2 \div 5 = 0.84$
		C1	for NO and explanation eg $27^\circ \neq 30^\circ$ eg sides are not in the same ratio
17	£4053.28	P1	for $12^2 + (18 - 13)^2$ oe (=169)
		P1	for $\sqrt{169}$
		A1	for 13
		P1	dep on use of Pythagoras for $(13 + 13 + 12 + 18) \times 72.38$
		A1	

Question	Topic	Step	Mark
1	Label a triangle opposite, adjacent and hypotenuse	6th	1
3	Know the formula for Pythagoras' theorem and use to find the hypotenuse	7th	2
5	Use the sine, cosine and tangent ratios to find the lengths of unknown sides in a right-angled triangle, using straight-forward algebraic manipulation, e.g. calculate the adjacent (using cosine), or the opposite (using sine or tangent ratios)	8th	2
7	Know the formula for Pythagoras' theorem and use to find a shorter side	8th	2
9	Use and apply Pythagoras' theorem to solve problems in 2D	8th	4
11	Find angles of elevation and angles of depression	9th	3
13	Use the trigonometric ratios to find the size of an angle in a right-angled triangle	8th	2
15	Use the trigonometric ratios to find the size of an angle in a right-angled triangle	9th	4
17	Use and apply Pythagoras' theorem to solve problems in 2D	8th	5

