

1	<p>Height of triangle = 765 or 1067 – 302</p> <p>$\sin x = \text{their } 765 / 1200$</p> <p>Inverse trig fn seen or used</p> <p>39.6(...)</p>	<p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p>soi; may be on diagram or used in working</p> <p>Or use of Pythagoras + other trig fn; Condone poor notation</p> <p>Condone poor notation</p> <p>Allow B4 for 39.6(...) www Allow A1 for 40 if correct method seen</p>	<p>Eg allow 2nd M1 for $\sin x = 1067 / 1200$</p> <p>Eg \cos^{-1} seen earns third M1</p> <p>NB 0 for scale drawing, except first M1 may be earned</p>
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2	(a)	(i) 221 to 4	1		
		<p>(ii) At least one side of AB, BC, CA measured accurately (11 cm, 9 cm, 8 cm with tolerance ± 1 mm)</p> <p>Total distance found e.g. 28 cm on map or 700 000 cm soi</p> <p>100 cm = 1 m and 1000 m = 1 km or 4 cm to 1 km soi</p> <p>7 [km] and appropriate comment</p>	<p>M1</p> <p>M1</p> <p>M1</p> <p>B1</p>	<p>May be implied by conversion to actual distances in cm, m or km (e.g. figs 275, 225, 2)</p> <p>FT <i>their</i> measurements; may be done after conversion</p> <p>May be earned earlier; need not be explicit M0 for e.g. 10 000 m = 1 km stated</p> <p>Accept 6.9 to 7.1 km and 'so OK', 'no, paths may be not straight so they have to go further' etc</p>	<p>Often seen by diagram; may be implied by 28 e.g. 2.75 [km] seen by diagram earns first and third M1s If only 8 seen must be clearly identified as AC</p> <p>Figs 7 imply this second M1</p> <p>May be implied by correct answer</p> <p>E.g. if measurements or 28 not seen, may earn M0 M1 M1 B1</p>
	(b)	<p>1.41(4...)</p> <p>Suitable comment e.g. '1.4 would be more accurate' or 'not too far out for a rough guide' or '1.5 is near and is easier for an estimate' or 'they have rounded wrongly it should be 1.4 not 1.5'</p>	<p>2</p> <p>1</p>	<p>M1 for $1^2 + 1^2$ or $\sqrt{2}$ oe soi Allow A1 for 1.4 if M1 earned</p> <p>Allow SC1 for $1.5^2 - 1^2 = 1.25$ followed by $\sqrt{1.25} = 1.1(18\dots)$ rot [can also earn comment mark following this]</p> <p>Dependent on answer 1.4 to 1.42 or Pythagoras attempted</p>	<p>Condone trigonometry used if correct answer obtained</p> <p>M0 for just $1 + 1 [= 2]$ with no evidence of squaring or square root</p> <p>Mark equivalently for other squares used e.g. M1 for $2^2 + 2^2$ and A1 for 2.82(8...) and B1 for comparison with 3</p>

	<p>(c)</p> $\tan x = \frac{400}{600}$ <p>Inverse trig function seen or used</p> <p>33.6 to 33.823 and appropriate comment e.g. not as steep as Mike thought</p>	<p>M1 <u>Alternative method</u> M2 for vertical = $600 \times \tan 40$</p> <p>M1 Or M1 for $\tan 40 = \frac{\text{vertical}}{600}$ or equivalents with horizontal distance AND A1 for vertical = 503(.45...) or horizontal = 476(.7...) and appropriate comment</p> <p>A1 Allow B3 for 33.6 to 33.823 or better and appropriate comment</p>	<p>Second M1 is independent of first – is earned for some indication that an inverse trig fn is needed to find an angle – even if done wrongly</p> <p>Comparison of $\tan 40$ with $\tan x$, both evaluated with appropriate comment earns full marks</p> <p>Allow A1 for any of the following oe: “Good estimate - only 6° out“ “Not a good estimate as it is 6° out “ “Not far off, but 30° would have been closer“ Condone ‘so OK’ etc</p>
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3	(a)	16.2 to 16.3	3	nfw M2 for $AP = \frac{50}{\tan 72}$ or $50 \times \tan(90 - 72)$ Or M1 for $\tan 72 = \frac{50}{AP}$ or $\tan(90 - 72) = \frac{AP}{50}$ SC1 only for 16.2 or 16.3 from scale drawing	Or M2 for $AP = \frac{50 \sin 18}{\sin 72}$ or for complete correct method using sin or cos and Pythagoras Or M1 for $\frac{50}{\sin 72} = \frac{AP}{\sin 18}$
	(b)	[0]77.7 to [0]77.82	3	nfw M1 for $\tan APC = \frac{75}{\text{their } AP}$ M1 for inverse trig fn soi If M2 earned, allow A1 for [0]78	Allow M1 for $\tan ACP = \frac{\text{their } AP}{75}$ provided angle is clearly indicated eg invsin seen earns M0M1 0 for scale drawing

Question		Answer	Marks	Part Marks and Guidance	
4	(a)	4.240(2...)		<p>M2 for $5 \times \cos \text{their}(90 - 58)$ or for $5 \times \sin 58$</p> <p>Or M1 for $\cos \text{their}(90 - 58) = \frac{AD}{5}$ or for $\sin 58 = \frac{AD}{5}$</p>	<p>Allow M2 for complete correct method of sin followed by Pythagoras, and allow A1 for answer to at least 4sf in range 4.239... to 4.2404...</p> <p>Condone poor notation such as $58 \sin = \frac{AD}{5}$, but M1 only for worse notation such as $58 \sin 5$ unless 4.240(2...) seen</p> <p>NB answer to 3 sf given – must have at least 4 figures shown for 3 marks</p>

Question		Answer	Marks	Part Marks and Guidance	
	(b)	108 to 109	6	<p>Obtained from correct calculations</p> <p>M1 for [BD =] $5 \times \sin \text{their}(90 - 58)$ or $5 \times \cos 58$ or $\sqrt{5^2 - 4.24^2}$ (= 2.65 or to more sf) or for [BD² =] 7.02(...)</p> <p>B1 for [DC =] 7.76 or to more sf</p> <p>M1 for attempt at using tan with <i>their</i> BD and DC (or attempt at using cos with <i>their</i> BC and DC, following cos rule attempt)</p> <p>M1 for inverse trig function seen or used</p> <p>A1 or B5 for BCD = 18.8 to 18.9° or DBC = 71.1 to 71.2°, with angle clearly identified; accept 71 for A1 if method seen</p> <p>Allow B4 for 18.8 to 18.9° or 71.1 to 71.2°, with angle not clearly identified; accept 71 with method seen</p> <p>0 for eg 109° with no working and no scale drawing</p>	<p>M0 for scale drawing</p> <p>Or M1 for $BC^2 = 5^2 + 12^2 - 2 \times 5 \times 12 \times \cos \text{their}(90 - 58)$ oe (eg $BC^2 = 68.89...$ or $BC = 8.3(0...)$)</p> <p>Or (instead of B1M1) M1 for $\frac{\sin C}{5} = \frac{\sin(\text{their}(90 - 58))}{\text{their } BC}$ oe (accept inverted)</p> <p>And M1FT for $\sin C = \frac{\sin(\text{their}(90 - 58))}{\text{their } BC} \times 5$</p> <p>Allow last M1 for inverse with any trig function</p> <p>If part marks are earned, a tick where each mark is earned will aid awarding the marks</p> <p>NB some relevant working for part (b) may have been done in part (a) or on the diagram.</p> <p>Angle on diagram measures about 109°, so they will probably have measured this</p>