

Trigonometry and Pythagoras

Mark Scheme 1

Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Topic	Shape, Space and Measures
Sub Topic	Trigonometry & Pythagoras(Trigonometry & Pythagoras Theorem)
Booklet	Mark Scheme 1

Time Allowed: 58 minutes

Score: /48

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	70%	60%	55%	50%	<50%

Question Number	Working	Answer	Mark	Notes
1.	$(BC =) 47 \sin 32^\circ$		5	M1 or for $(CD =) \frac{47 \sin 32^\circ}{\sin 129^\circ}$
	24.906... at least 3 sf (may be implied by correct BD)			A1 or for $CD = 32.048...$ at least 2 sf (may be implied by correct BD)
	$\tan 51^\circ = \frac{\text{"24.906..."}}{BD}$ or $\tan 39^\circ = \frac{BD}{\text{"24.906..."}}$			M1 or for $\cos 51^\circ = \frac{BD}{\text{"32.048..."}}$
	$(BD =) \frac{\text{"24.906..."}}{\tan 51^\circ}$ or $\text{"24.906..." } \tan 39^\circ$			M1 or for $(BD =) \text{"32.048..." } \cos 51^\circ$
		20.2		A1 for answer rounding to 20.2 (20.1686...)
				Total 5 marks

2.	Use of $\sin 42$ or $\cos (90 - 42)$ $9.3 \times \sin 42$ or $9.3 \cos (90 - 42)$	6.22	3	M1 $9.3^2 - (9.3 \cos 42)^\circ (=38.72..)$ M1 $\sqrt{(\text{"38.72.."})}$ (M1 dep) A1 awrt 6.22 6.22(2914...)	Total 3 marks
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3.	$\frac{AB}{\sin 28} = \frac{10.2}{\sin 134}$ $(AB =) \sin 28 \times \frac{10.2}{\sin 134}$	6.66	3	M1 M1 isolate AB correctly (14.17 or 14.18 or 14.2 for $\frac{10.2}{\sin 134}$) A1 (6.65695....) awrt 6.66	Total 3 marks
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4. (a)	$(AC^2 =) 5^2 + 7^2 (=74)$ $(AG^2 =) "74" + 3^2 (=83)$ $(AG =) \sqrt{"83"}$	9.11	3	M1 or $AC = 8.6..$ or $(BG^2) = 3^2 + 7^2 (=58)$ or $(AF^2) = 3^2 + 5^2$ $(AG^2 =) "58" + 5^2 (=83)$ M1 ft (dep on M1) M1M1 for $\sqrt{(5^2 + 7^2 + 3^2)}$ A1 awrt 9.11
(b)	$\sin \theta = 3 / \sqrt{"83"}$	19.2	2	M1 or $\cos \theta = \sqrt{"74"} / \sqrt{"83"}$ or $\tan \theta = 3 / \sqrt{"74"}$ or $\cos \theta = \frac{"74" + "83" - 9}{2 \times \sqrt{"74"} \times \sqrt{"83"}}$ A1 awrt 19.2 or 160.8
				Total 5 marks

5. (a)	Use of sine or $\frac{\sin x}{3.4} = \frac{\sin 90}{5.8}$ $\sin "x" = 3.4 / 5.8 (=0.586..)$	35.9	3	M1 Sine must be selected for use. M1 A1 (35.888...) Use isw on awrt 35.9
(b)		5.85	1	B1 accept 5.849 rec
(ii)		5.75	1	B1
				Total 5 marks

6.	$(\cos x^\circ =) \frac{4^2 + 6^2 - 8^2}{2 \times 4 \times 6}$ or $8^2 = 4^2 + 6^2 - 2 \times 4 \times 6 \cos x^\circ$		3	M1 for correct substitution in Cosine Rule
	$(\cos x^\circ =) -0.25$ oe			A1
		104.5		A1 for value rounding to 104.5 (104.4775...)
				Total 3 marks

7. (a)	$7.9 \times \cos 38^\circ$ or $7.9 \times \sin 52^\circ$	6.23	3	M2 M1 for $\cos 38^\circ$ or $\sin 52^\circ$ selected A1 6.2252.. awrt 6.23
(b)(i)		37.5	1	B1
(b)(ii)		38.5 or 38.49 rec	1	B1
				Total 5 marks

8..	$7^2 = 9^2 + 13^2 - 2 \times 9 \times 13 \cos x$ oe $234 \cos x = 201$		30.8	3	M1 M1 A1	or $\cos x = 0.86$ or better 30.798... awrt 30.8
Total 3 marks						

9.	$\sqrt{(16^2 + 10^2)}$ (=18.9 or better) “18.867” $\div 2$ (=9.433) $\tan "x" = 15 / "9.433"$		57.8	4	M1 M1 dep on previous M1 M1 dep on M2 A1	or M2 for $\sqrt{(8^2 + 5^2)}$ (=9.43 or better) 57.832..... awrt 57.8
Total 4 marks						

10.	$\angle ADC = 149^\circ$ or $\angle CAD = 21^\circ$		6	B1	May be stated or marked on diagram	
	$\frac{AC}{\sin 149^\circ} = \frac{16.5}{\sin 10^\circ}$	$\frac{CD}{\sin 21^\circ} = \frac{16.5}{\sin 10^\circ}$		M1	for correct substitution in Sine Rule	
	$(AC =) \frac{16.5 \sin 149^\circ}{\sin 10^\circ}$	$(CD =) \frac{16.5 \sin 21^\circ}{\sin 10^\circ}$		M1	for correct rearrangement	
	$(AC =) 48.938...$	$(CD =) 34.052...$		A1	for correct length of AC or CD (rounded or truncated to at least 3 sf)	
	$(AB =) "48.938..." \times \sin 69^\circ$ or 45.6(88...)	$(BD =) "34.052..." \times \sin 59^\circ$ or 29.1(88...)		M1	rounded or truncated to at least 3 sf	
		45.7		A1	for ans which rounds to 45.7	
Total 6 marks						

11.	use of cos		3	M1	cos must be selected for use in trig ratio NOT Cosine Rule	or M2 for sin and $\frac{\sqrt{"21.36"}}{9.5}$ following correct Pythagoras or M2 for tan and $\frac{\sqrt{"21.36"}}{8.3}$ following correct Pythagoras or correct Pythag and then correct use of sine or cosine rule with "21.36"
	$\cos ("x") = \frac{8.3}{9.5} (=0.87\dots)$ or $("x" =) \cos^{-1} \left(\frac{8.3}{9.5} \right)$			M1		
		29.1		A1	for awrt 29.1 e.g. (29.1103...)	
						Total 3 marks

12.	$\frac{2.9}{\sin 36^\circ} = \frac{QS}{\sin(180-62)^\circ}$		3	M1	for correct substitution into the Sine Rule	Condone use of 62 instead of 118
	$(QS =) \frac{2.9 \sin "118"^\circ}{\sin 36^\circ}$ oe			M1	for correct rearrangement (there may be partial evaluation)	
		4.36		A1	for awrt 4.36	
						Total 3 marks