



AQA Qualifications

AQA Level 2 Certificate

FURTHER MATHEMATICS

Level 2 (8365)

Mark Scheme
Worksheet 4
Trigonometry

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Glossary for Mark Schemes

These examinations are marked in such a way as to award positive achievement wherever possible. Thus, for these papers, marks are awarded under various categories.

- M** Method marks are awarded for a correct method which could lead to a correct answer.
- A** Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
- B** Marks awarded independent of method.
- M Dep** A method mark dependent on a previous method mark being awarded.
- B Dep** A mark that can only be awarded if a previous independent mark has been awarded.
- ft** Follow through marks. Marks awarded following a mistake in an earlier step.
- SC** Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
- oe** Or equivalent. Accept answers that are equivalent.
eg, accept 0.5 as well as $\frac{1}{2}$

4 Trigonometry

Question	Answer	Mark	Comments
1	$\sqrt{3}/2 + \sqrt{3}/2 - 1$	M1	Any 2 values correctly stated in surd form
	$\sqrt{3}/2 + \sqrt{3}/2 - 1$	M1	All 3 values correctly stated in surd form
	$\sqrt{3} - 1$	A1	
2	False	A1	
	True	A1	
	False	A1	
	True	A1	
3	Evidence that $\sin 45^\circ = 1/\sqrt{2}$	B1	
	Area = $\frac{1}{2} \times 5 \times 6\sqrt{2} \times \sin 45^\circ$	M1	
	15	A1	
4	$\tan \theta \equiv \frac{\sin \theta}{\cos \theta}$ seen	M1	
	$\frac{\sin^2 \theta}{\cos^2 \theta} \equiv \frac{1 - \cos^2 \theta}{\cos^2 \theta}$	M1	
	$\tan \theta \equiv \frac{1}{\cos^2 \theta} - 1$	A1	Accurate method with clear steps is required for all 3 marks
Alt 4	$\frac{1 - \cos^2 \theta}{\cos^2 \theta}$	M1	oe
	$\frac{\sin^2 \theta}{\cos^2 \theta}$	M1	
	$\tan^2 \theta$	A1	Accurate method with clear steps is required for all 3 marks

Question	Answer	Mark	Comments	
5	Evidence that angle ADC is a right angle	M1		
	$\sin ACD = \frac{4}{5}$	M1		
	$ACD = [53.1, 53.13010235]$	A1		Allow 53 with method seen
	$Angle ABD = [53.1, 53.13010235]$	B1 ft		ft From 3rd mark their angle ACD
6	A triangle formed with A , B and the centre of the hemisphere with 2 sides of 10 cm and an angle of 120°	M1		
	$(AB^2 =) 10^2 + 10^2 - 2 \times 10 \times 10 \times \cos 120$	M1		$2 \times 10 \times \sin 60$
	$(AB =) [17.3, 17.321]$	A1		oe eg, $\sqrt{300}$
	$(\cos AOB =) \frac{30^2 + 30^2 - \text{their } AB^2}{2 \times 30 \times 30}$	M1		$2 \times \sin^{-1} (0.5 \text{ their } AB \div 30)$
	$[33.557, 33.6]$	A1 ft		ft Their AB Accept 34 with correct method seen
7	$\tan \theta = +\sqrt{2}$ or $\tan \theta = -\sqrt{2}$	M1		
	$[54.7, 54.74]$ or $[125.26, 125.3]$	A1		
	$180 + \text{their } [54.7, 54.74]$ or $180 + \text{their } [125.26, 125.3]$	M1		
	$[54.7, 54.74]$ and $[125.26, 125.3]$ and $180 + \text{their } [54.7, 54.74]$ and $180 + \text{their } [125.26, 125.3]$	A1ft		All 4 solutions $[54.7, 54.74]$ and $[125.26, 125.3]$ must be correct ft For other two solutions

Question	Answer	Mark	Comments
8	$(3\cos \theta - 1)(\cos \theta + 1)$	M2	M2 Fully correct use of quadratic formula M1 $(a\cos \theta + b)(c\cos \theta + d)$ where $ac = 3$ and $bd = \pm 1$ or quadratic formula with one sign error
	$\cos \theta = -1$ so $\theta = 180^\circ$	A1	
	$\cos \theta = \frac{1}{3}$ so $\theta = [70.5, 70.53]$	A1	
	$\theta = 289.5^\circ$	A1 ft	ft 360 – their [70.5, 70.53]
9 (a)	$\left(\frac{20}{2}\right)^2 + \left(\frac{30}{2}\right)^2$	M1	
	$\sqrt{325}$ or $5\sqrt{13}$ or 18.0(2...) or 18.03	A1	
	(b) $\frac{\sin CAB}{\text{their } 18.03} = \frac{\sin 59}{22}$	M1	oe
	$\sin^{-1}\left(\frac{\sin 59}{22} \times \text{their } 18.03\right)$	M1dep	
	44.6...	A1	