

Question number	Scheme	Marks
10(a)	$MD = 6 \cos 30 = 3\sqrt{3}$ *	M1A1cso (2)
(b)	Height of triangle = $6 \sin 30 = 3$ cm \Rightarrow ht = $8 + 3 = 11$ cm *	M1A1cso (2)
(c)	$MG = \sqrt{10^2 + (3\sqrt{3})^2} (= \sqrt{127})$ $BG = \sqrt{11^2 + 127} = 2\sqrt{62} = 15.7$	M1 dM1A1 (3)
(d)	$AC = 2 \times MD = 6\sqrt{3}$ or $CE = \sqrt{172}$ Angle $ECA = \tan^{-1}\left(\frac{8}{6\sqrt{3}}\right) = 37.6, \Rightarrow$ Angle required = $37.6 + 30 = 67.6^\circ$	B1 M1,A1cao (3)
(e)	$BE = \sqrt{11^2 + (3\sqrt{3})^2} = 2\sqrt{37}$ (Angle $EAB = 90 + 30 = 120^\circ$) $\frac{\sin ABE}{8} = \frac{\sin 120}{2\sqrt{37}}, \Rightarrow$ angle $ABE = 34.7^\circ$	M1A1 M1A1,A1 (5)
		[15]

- (a)**
M1 Attempt the length of MD using sin or cos of 60 or 30 or sin/cosine rule in $\triangle ABC$ to find AC and divide by 2
A1cso Correct, GIVEN, result from a correct statement
- (b) M1** Attempt the height of the triangle using sin or cos of 60 or 30 or any other complete method **and** add to 8. (Addition must be seen)
A1cso 11 (cm) with no errors seen
- (c) M1** Attempt the length of MG using Pythagoras with a + sign
dM1 Attempt the length of BG using Pythagoras with a + sign. Depends on the first M mark.
A1 Correct answer. Must be 3 sf
- (d) B1** Correct (numerical) length of AC or CE decimals allowed
M1 Find angle ECA using sine, cosine or tangent. Cosine rule may be used in triangle BCE to find angle BCE but method must be **complete**, so length BE must be found.
A1cao Obtain the correct answer by adding 30 to 37.6 or from the cosine rule. Must be 1 dp
- (e) M1** Attempt the length of BE using Pythagoras with a + sign.
A1 Correct length. NB: These 2 marks can be awarded for work seen in (d) **provided** used here.
M1 Any complete method for obtaining angle ABE (oe)
A1 Correct numbers in their choice of method
A1 Correct answer, must be 1 dp unless already penalised in (d)

