

QUESTION NUMBER	SCHEME	MARKS
	N.B. They may do (ii) first using the OR method to find α (and possibly β) and then use either angle to do (i), using the Sine Rule or Cosine Rule.	
4		
4(i)	<p>Complete method to find an equation in X only:</p> <ul style="list-style-type: none"> Using correct vector triangle with cosine rule: $129 = X^2 + (5\sqrt{3})^2 - 2X \times 5\sqrt{3} \cos 30^\circ$ Using correct vector triangle with sine rule to find α: $\frac{\sqrt{129}}{\sin 30^\circ} = \frac{5\sqrt{3}}{\sin \alpha}$ $\alpha = 22.4109^\circ \Rightarrow \beta = 180^\circ - 30^\circ - 22.4109^\circ = 127.589^\circ$ <p>Then sine rule: $\frac{X}{\sin \beta} = \frac{\sqrt{129}}{\sin 30^\circ} = \frac{5\sqrt{3}}{\sin \alpha}$</p> <p>or cosine rule: $(5\sqrt{3})^2 = X^2 + 129 - 2X\sqrt{129} \cos \alpha$ or $X^2 = (5\sqrt{3})^2 + 129 - 2 \times 5\sqrt{3} \times \sqrt{129} \cos \beta$ to find X.</p> Using components with magnitude: $\sqrt{129} = \sqrt{(X \cos 30^\circ - 5\sqrt{3})^2 + (X \sin 30^\circ)^2}$ 	M1 A1
	Solves their equation (if quadratic, must include an X term) to find an X value.	M1
	$X = 18$	A1
4(ii)	<p>EITHER</p> <p>Finds an equation in β only using their X: e.g.</p> $\frac{18}{\sin \beta} = \frac{\sqrt{129}}{\sin 30^\circ}$	M2