Question number	Scheme	Marks
4 (a)	$A = \frac{1}{2} \times 8 \times 8 \times \sin 60^\circ = \left(16\sqrt{3}\right)$	M1
	$48\sqrt{3} = \frac{1}{3} \times '16\sqrt{3}' \times h \Rightarrow h = 9$ *	M1 A1cso [3]
(b)	$BX = \sqrt{9^2 + 8^2} = \sqrt{145}$	M1
	$\angle BXC = \frac{'145' + '145' - 8^2}{2 \times '\sqrt{145}' \times '\sqrt{145}'} = 38.8025...^\circ \approx 38.8^\circ$	M1A1 [3]
(c)	Let midpoint of BC be M	
	$AM = \sqrt{8^2 - 4^2} = \left(4\sqrt{3}\right)$ or $MX = \sqrt{145 - 4^2} = \left(\sqrt{129}\right)$	M1
	$\angle XMA = \tan^{-1}\left(\frac{9}{'4\sqrt{3}'}\right)$ or $\angle XMA = \sin^{-1}\left(\frac{9}{'\sqrt{129}'}\right)$ or $\angle XMA = \cos^{-1}\left(\frac{'4\sqrt{3}'}{'\sqrt{129}'}\right)$	M1
	$= 52.4109...^\circ \approx 52.4^\circ$	A1 [3]
	ALT 1	
	Let midpoint of BC be M	
	$(XA)^2 = (AM)^2 + (XM)^2 - 2(AM)(XM)\cos\theta$	{M1}
	$9^2 = \left(8^2 - 4^2\right) + \left(8^2 + 9^2 - 4^2\right) - 2\sqrt{8^2 - 4^2}\sqrt{8^2 + 9^2 - 4^2}\cos\theta$	{M1}
	$\theta = 52.4109...^\circ \approx 52.4^\circ$	{A1} [3]
		Total 9 marks

(a)	
M1	Use of $\frac{1}{2}ab\sin C$ (may be implied by $\left(16\sqrt{3}\right)$
M1	Use of $\frac{1}{3} \times$ 'Area of base' $\times h$
A1 cso	Obtains the **given** answer with no errors in the working
(b)	
M1	Use of $\sqrt{(\text{part } a)^2 + 8^2}$ (may be implied by $\sqrt{145}$)
M1	Use the cosine rule, either form. If not for angle BXC there must be a complete method shown for obtaining BXC (follow through their BX)
A1	awrt 38.8°
(c)	
M1	Use of Pythagoras' to find the length of AM or MX (may be implied by $4\sqrt{3}$ or $\sqrt{129}$)
M1	$\tan^{-1}\left(\frac{9}{'4\sqrt{3}'}\right)$ or $\sin^{-1}\left(\frac{9}{'\sqrt{129}'}\right)$ or $\cos^{-1}\left(\frac{'4\sqrt{3}'}{'\sqrt{129}'}\right)$
A1	awrt 52.4°

ALT	
M1	Use of cosine rule using *AX*, *AM* and *XM* e.g. $(XA)^2 = (AM)^2 + (XM)^2 - 2(AM)(XM)\cos\theta$
M1	Correct values substituted into the cosine rule in any form e.g. $9^2 = \left(8^2 - 4^2\right) + \left(8^2 + 9^2 - 4^2\right) - 2\sqrt{8^2 - 4^2}\sqrt{8^2 + 9^2 - 4^2}\cos\theta$
A1	awrt 52.4°