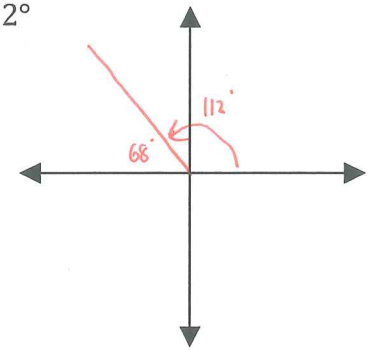
Name: KEY TA:_____

Math 11 Pre-Calculus LG 3 Ver A **/18**

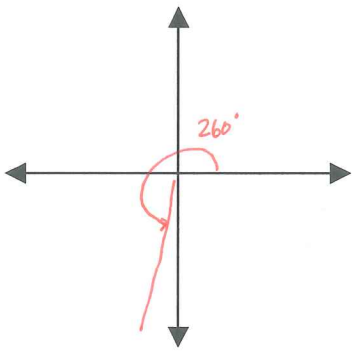
1. Without measuring, sketch the following angles in standard position. For each angle, state the reference angle. *(2 marks)*

a) 112°



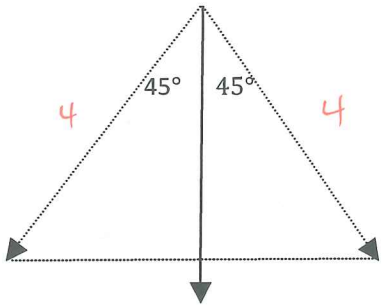
Reference angle: 68°

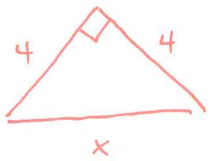
b) 260°



Reference angle: 80°

2. A large grandfather clock has a pendulum that is 4m long. The pendulum swings 45° to the left and right of vertical. What *horizontal* distance does the tip of the arm move in one complete swing? Give an *exact* answer. *(2 marks)*





$x^2 = 4^2 + 4^2$

$= 16 + 16$

$= 32$

$x = \sqrt{32} = 4\sqrt{2}$ m

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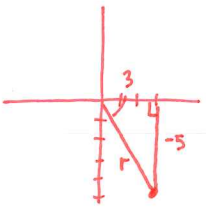
3. Determine the exact values of sin θ, cos θ, and tan θ if the terminal arm of an angle in standard position passes through the point (3,-5). *(3 marks)*



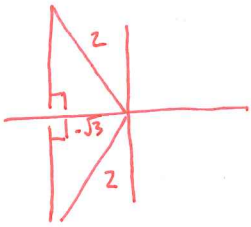
$r^2 = 3^2 + (-5)^2$
$= 9 + 25$
$= 34$
$r = \sqrt{34}$

$\sin\theta = \frac{-5}{\sqrt{34}}$

$\cos\theta = \frac{3}{\sqrt{34}}$

$\tan\theta = \frac{-5}{3}$

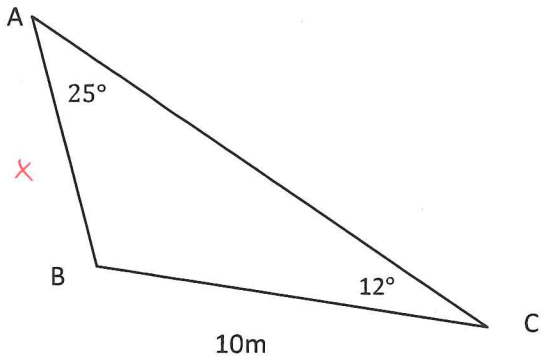
4. Solve for θ if $\cos\theta = -\frac{\sqrt{3}}{2}$, where $0° \leq \theta < 360°$. *(2 marks)*



ref $\theta = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right) \Rightarrow \theta = 30°$ (ref) in QII, III

150°, 210°

5. Find the length of side AB. *(2 marks)*



$\frac{\sin 25°}{10} = \frac{\sin 12°}{AB}$

$AB \cdot \sin 25° = 10 \sin 12°$

$AB = \frac{10 \sin 12°}{\sin 25°}$

$= 4.92\text{m}$

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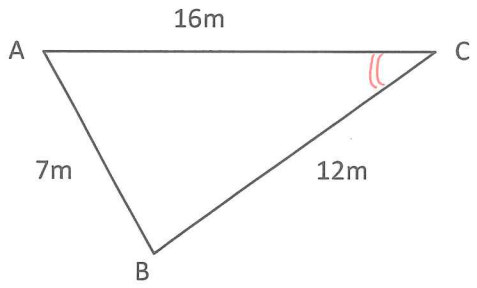
6. Determine the measure of angle C to 2 decimal places. *(2 marks)*



$c^2 = a^2 + b^2 - 2ab\cos C$

$7^2 = 12^2 + 16^2 - 2(12)(16)\cos C$

$49 = 144 + 256 - 384\cos C$

$49 = 400 - 384\cos C$

$-400 \quad -400$

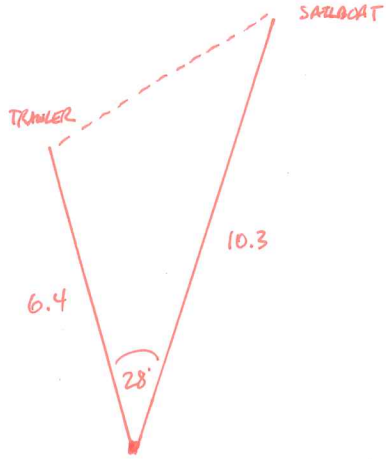
$-351 = -384\cos C$

$\cos C = \left(\frac{351}{384}\right)$

$C = \cos^{-1}\left(\frac{351}{384}\right) = \cos^{-1}(0.914)$

$C \doteq \boxed{23.93^\circ}$

7. A radio tracking station locates a fishing trawler 6.4 nautical miles away, and a sailboat 10.3 nautical miles away. At the station, the angle between the lines of sight to the two ships is 28°. How far apart are the ships? *(2 marks)*



$c^2 = a^2 + b^2 - 2ab\cos C$

$= 6.4^2 + 10.3^2 - 2(6.4)(10.3)\cos 28^\circ$

$= 147.05 - 131.84\cos 28^\circ$

$\doteq 30.64$

$c \doteq \sqrt{30.64} \doteq \boxed{5.5 \text{ nautical miles apart}}$

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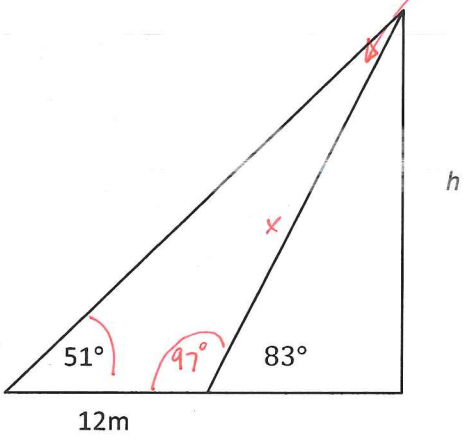
8. Sandra wanted to find the height of the school flag pole. She measured the angle to the top of pole to be 51°. She walked 12m closer to the pole and measured an angle of 83°. What is the height of the flag pole? Give your answer to 2 decimal places. *(3 marks)*



$\frac{\sin 32^\circ}{12} = \frac{\sin 51^\circ}{x}$

$x \frac{\sin 32^\circ}{\sin 32^\circ} = \frac{12 \sin 51^\circ}{\sin 32^\circ}$

$x \doteq 17.598$

$\sin 83^\circ = \frac{h}{17.598}$

$h = (17.598)(\sin 83^\circ)$

$\doteq \boxed{17.47 \text{ m}}$

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