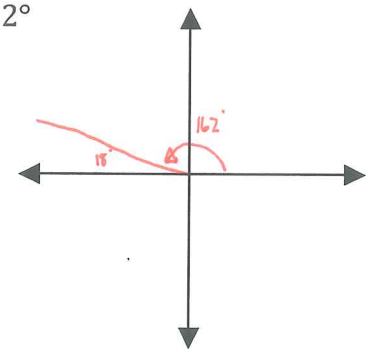
Name: KEY TA:_____

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

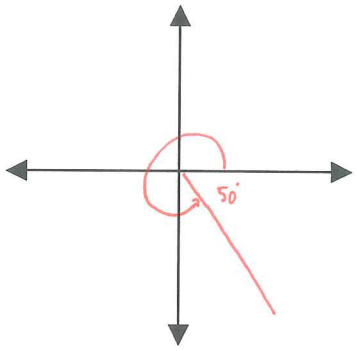
1. Without measuring, sketch the following angles in standard position. For each angle, state the reference angle. *(2 marks)*

a) 162°



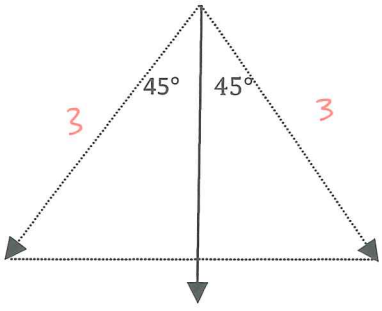
Reference angle: 18°

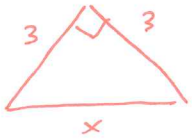
b) 310°



Reference angle: 50°

2. A large grandfather clock has a pendulum that is 3m 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)*





$x^2 = 3^2 + 3^2$

$= 9 + 9$

$= 18$

$x = \sqrt{18} =$ $3\sqrt{2}$ m apart

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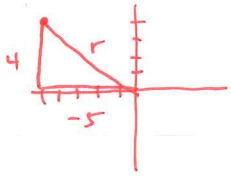
3. Determine the exact values of sin θ, cos θ, and tan θ if the terminal arm of an angle in standard position passes through the point (-5,4). *(3 marks)*



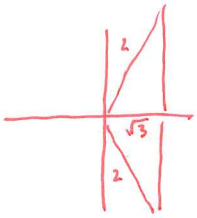
$r^2 = 4^2 + (-5)^2$
$= 16 + 25$
$= 41$
$r = \sqrt{41}$

$\sin\theta = \frac{4}{\sqrt{41}}$

$\cos\theta = \frac{-5}{\sqrt{41}}$

$\tan\theta = -\frac{4}{5}$

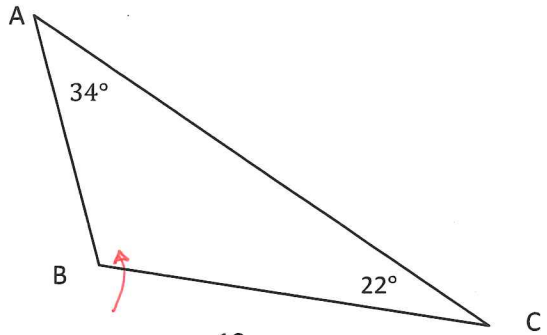
4. Solve for θ if $\cos\theta = \frac{\sqrt{3}}{2}$, where $0° \leq \theta < 360°$. *(2 marks)*



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

$30°, 330°$

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



$180° - 34° - 22°$
$= 124°$

$\frac{\sin 34°}{18} = \frac{\sin 124°}{AC}$

$AC \cdot \sin 34° = 18 \cdot \sin 124°$

$AC = \frac{18 \cdot \sin 124°}{\sin 34°}$

$\doteq 26.69\text{m}$

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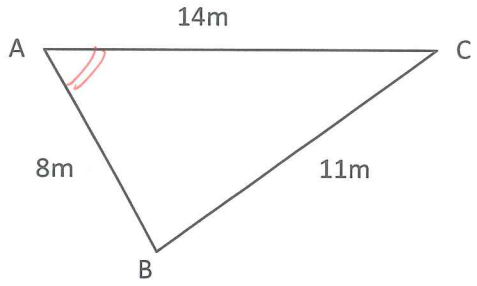
6. Determine the measure of angle A to 2 decimal places. *(2 marks)*



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

$11^2 = 8^2 + 14^2 - 2(8)(14)\cos C$

$121 = 64 + 196 - 224\cos C$

$121 = 260 - 224\cos C$

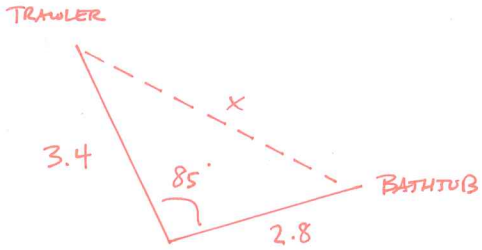
$-260 \quad -260$

$-139 = -224\cos C$

$\cos C = \frac{139}{224}$

$C = \cos^{-1}\left(\frac{139}{224}\right) = 51.64^\circ$

7. A radio tracking station locates a fishing trawler 3.4 nautical miles away, and a floating bathtub 2.8 nautical miles away. At the station, the angle between the lines of sight to the two vessels is 85°. How far apart are the vessels? *(2 marks)*



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

$= 3.4^2 + 2.8^2 - 2(3.4)(2.8)\cos 85^\circ$

$= 19.4 - 19.04\cos 85^\circ$

$= 17.74$

$c = \sqrt{17.74} = 4.2$ nautical miles apart

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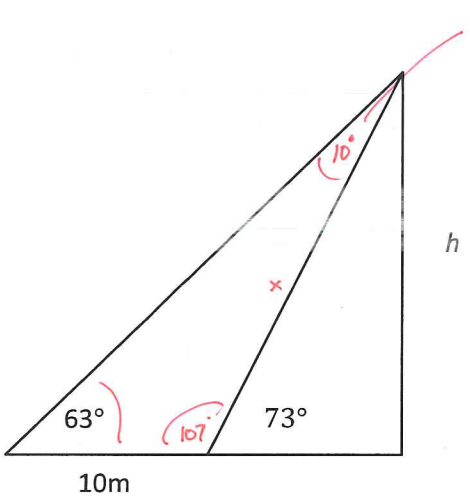
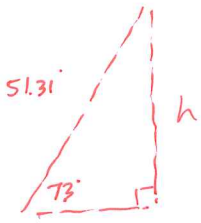
8. Kevin wanted to find the height of the school flag pole. He measured the angle to the top of pole to be 63°. He then walked 10 m closer to the pole and measured an angle of 73°. What is the height of the flag pole? Give your answer to 2 decimal places. *(3 marks)*



$\frac{\sin 10^\circ}{10} = \frac{\sin 63^\circ}{x}$

$x \cdot \frac{\sin 10^\circ}{\sin 10^\circ} = \frac{10 \sin 63^\circ}{\sin 10^\circ}$

$\doteq 51.31$



$\sin 73^\circ = \frac{h}{51.31}$

$h = (51.31)(\sin 73^\circ)$

$\doteq \boxed{49.07\text{m}}$

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