Pre-calculus 4:4,8 Review Sheet Name: Key Hour: ____

1. Evaluate: $\sec\left(\frac{\pi}{2}\right)$

$\frac{1}{\cos\frac{\pi}{2}} = \frac{1}{0} = $ UND

2. Let θ be an angle in standard position, name the quadrant in which θ lies. When cosθ<0 and cot θ>0.

neg: QII, QIII

pos: QI, QIII

QIII

3-7. Given $\tan\theta = -\frac{1^{y}}{3_{x}}$, and 90°<θ<180°. Find the exact value of the remaining five trigonometric functions.

$y=1 \quad x=-3 \quad r=\sqrt{10}$

$1^2+(-3)^2=r^2$

$1+9=r^2$

$\sqrt{10}=\sqrt{r^2}$

$r=\sqrt{10}$

$\sin\theta = \frac{y}{r} = \frac{1}{\sqrt{10}}\left(\frac{\sqrt{10}}{\sqrt{10}}\right) = \frac{\sqrt{10}}{10}$

$\cos\theta = \frac{x}{r} = \frac{-3}{\sqrt{10}}\left(\frac{\sqrt{10}}{\sqrt{10}}\right) = \frac{-3\sqrt{10}}{10}$

$\tan\theta = -1/3$

$\csc\theta = \sqrt{10}$

$\sec\theta = \frac{\sqrt{10}}{-3}$

$\cot\theta = -3/1$

8-9. Find a reference angle for cot(-210°), and then evaluate using the reference angle.

$\cot(-210°)$
$+360$

$\cot(150°)$ QII

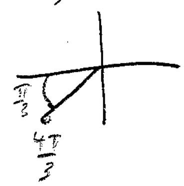
$\frac{\text{ref } \angle}{30°}$

$\cot 30° = \frac{x}{y}$

$\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3}}{\cancel{2}} \cdot \frac{\cancel{2}}{1} = -\sqrt{3}$

$\cot(-210°) = -\sqrt{3}$

10-11. Find a reference angle for $\sin\left(\frac{22\pi}{3}\right)$, and then evaluate using the reference angle.



$\frac{22\pi}{3} - \frac{18\pi}{3} = \frac{4\pi}{3}$ QIII

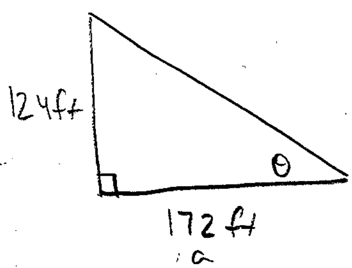
$\boxed{\frac{\text{ref } \angle \text{ of } \frac{4\pi}{3}}{\boxed{\frac{\pi}{3}}}}$

$\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$

$\sin\left(\frac{22\pi}{3}\right) = -\frac{\sqrt{3}}{2}$

12-13. A tower that is 124 feet tall casts a shadow 172 feet long. Find the angle of elevation of the sun to the nearest degree.

$\theta = \tan^{-1}\left(\frac{124}{172}\right)$

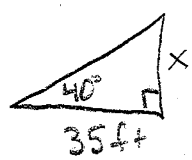


$\theta = 35.78$

$\boxed{36°}$

14-15. At a certain time of day, the angle of elevation of the sun is 40°. To the nearest foot, find the height of a tree whose shadow is 35 feet long.

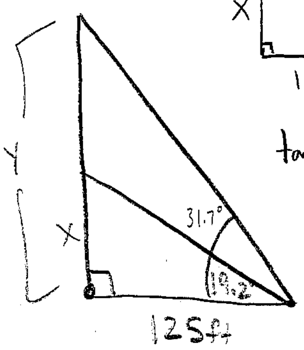
$35 \cdot \tan 40° = \frac{x}{\cancel{35}} \cdot \cancel{35}$

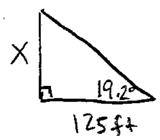


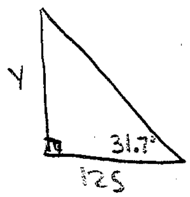
$x = 29.36$

29ft

16-17. A hot air balloon is rising vertically. From a point on level ground 125 feet from the point directly under the passenger compartment, the angle of elevation to the balloon changes from 19.2° to 31.7°. How far, to the nearest tenth of a foot, does the balloon rise during this period?







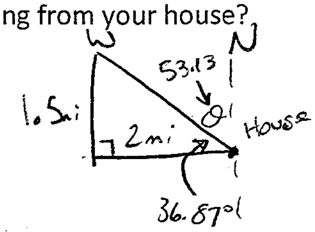
$\tan 19.2 = \frac{x}{125}$ $\tan 31.7 = \frac{y}{125}$

$x = 43.5$ $x = 77.2$

$77.2 - 43.5$

33.7ft

18-19. You leave your house and run 2 miles due west followed by 1.5 miles due north. At that time what is your bearing from your house?

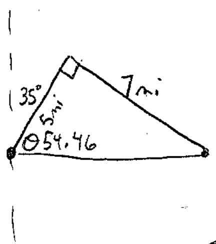


$x = \tan^{-1}\left(\frac{1.5}{2}\right) = 36.87°$

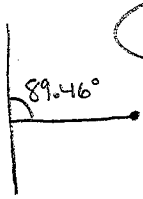
N 53.13°W

20-22. A jet leaves a runway whose bearing is N35E from the control tower. After flying 5 miles, the jet turns 90 and flies on a bearing of S55˚E for 7 miles. At that time, what is the bearing of the jet from the control tower?

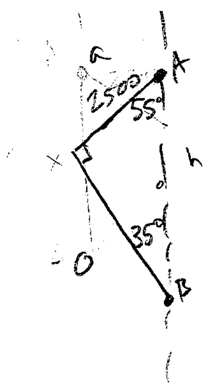
$\theta = \tan^{-1}\left(\frac{7}{5.}\right) = 54.46°$



N89.46°E



23-25. Two lighthouses are located on the north-south line. From lighthouse A the bearing of a ship 2500 meters away is $S55°W$. From lighthouse B the bearing of the ship is $N35°W$. Find the distance between the two lighthouses.

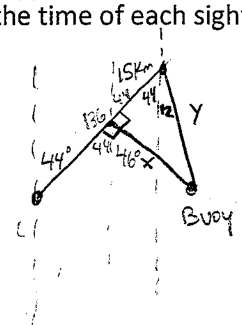


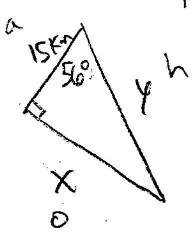
$\cos 55° = \frac{2500}{x}$

$x = \frac{2500}{\cos 55}$

$x = 4358.62$m

Bonus: The navigator of a ship on a N44°E course sights a buoy with a bearing of S46°E. After the ship sails 15 km along the same course, the navigator sights the same buoy with a bearing S12°E. Find the distance between the ship and the buoy at the time of each sighting.





$15 \cdot \tan 56° = \frac{x}{15} \cdot 15$

$x = \underline{22.24}$Km

$\frac{y \cdot \cos 56°}{\cos 56} = \frac{\frac{15}{y} \cdot y}{\cos 56}$

$y = \frac{15}{\cos 56}$

$y = \underline{26.82}$Km