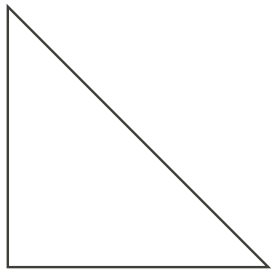
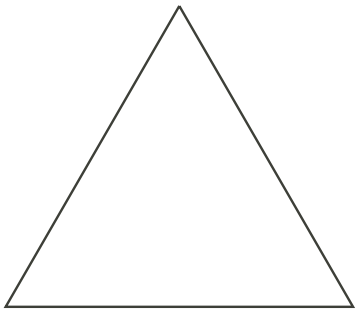
Trigonometric Functions & Special Angles Name _____

Section _____

Do these without a calculator.

1. Using the equilateral triangle and right isosceles triangle, determine all trigonometric ratios of the special angles $\pi/6$, $\pi/4$ and $\pi/3$. Fill in your answers below.





Hint: Label the equal legs of the right isosceles triangle length 1. Label all sides of the equilateral triangle length 2.

$\sin\left(\frac{\pi}{4}\right) \stackrel{?}{=}$ $\cos\left(\frac{\pi}{4}\right) \stackrel{?}{=}$ $\tan\left(\frac{\pi}{4}\right) \stackrel{?}{=}$

$\sin\left(\frac{\pi}{3}\right) \stackrel{?}{=}$ $\cos\left(\frac{\pi}{3}\right) \stackrel{?}{=}$ $\tan\left(\frac{\pi}{3}\right) \stackrel{?}{=}$

$\sin\left(\frac{\pi}{6}\right) \stackrel{?}{=}$ $\cos\left(\frac{\pi}{6}\right) \stackrel{?}{=}$ $\tan\left(\frac{\pi}{6}\right) \stackrel{?}{=}$

2. Fill in the sign of trigonometric value of angle θ in the indicated quadrant.

	1st Quadrant	2nd Quadrant	3rd Quadrant	4th Quadrant
$\sin\theta$	+			
$\cos\theta$				
$\tan\theta$				

3. Circle the correct sign for the following trigonometric values.

3a. $\cos\left(\frac{5\pi}{4}\right)$ is positive? negative?

3b. $\sin\left(-\frac{3\pi}{4}\right)$ is positive? negative?

3c. $\cos\left(-\frac{\pi}{3}\right)$ is positive? negative?

3d. $\tan\left(\frac{13\pi}{6}\right)$ is positive? negative?

4. Without using a calculator, answer the questions below:

4a. Which quadrant is $\frac{5\pi}{4}$ in? Answer: _____

4b. What is the reference angle of $\frac{5\pi}{4}$? Answer: _____

(Recall: The reference angle is the **acute** angle between terminal edge and horizontal axis.)

4c. Write down the trigonometric values of $\frac{5\pi}{4}$ in terms of the trigonometric values of its reference angle. Indicate clearly the sign.

$\sin\left(\frac{5\pi}{4}\right) \stackrel{?}{=}$ $\cos\left(\frac{5\pi}{4}\right) \stackrel{?}{=}$ $\tan\left(\frac{5\pi}{4}\right) \stackrel{?}{=}$

4d. Using 4(c), write down the exact trigonometric values of $\frac{5\pi}{4}$.

$\sin\left(\frac{5\pi}{4}\right) \stackrel{?}{=}$ $\cos\left(\frac{5\pi}{4}\right) \stackrel{?}{=}$ $\tan\left(\frac{5\pi}{4}\right) \stackrel{?}{=}$

5. Using the steps in Q4 above, write down the exact values of the following trigonometric values.

$\sin\left(-\frac{3\pi}{4}\right) \stackrel{?}{=}$ $\cos\left(-\frac{3\pi}{4}\right) \stackrel{?}{=}$ $\tan\left(-\frac{3\pi}{4}\right) \stackrel{?}{=}$

$\sin\left(-\frac{\pi}{3}\right) \stackrel{?}{=}$ $\cos\left(-\frac{\pi}{3}\right) \stackrel{?}{=}$ $\tan\left(-\frac{\pi}{3}\right) \stackrel{?}{=}$

$\sin\left(\frac{13\pi}{6}\right) \stackrel{?}{=}$ $\cos\left(\frac{13\pi}{6}\right) \stackrel{?}{=}$ $\tan\left(\frac{13\pi}{6}\right) \stackrel{?}{=}$

6. Find the exact value of the following **without a calculator**.

6a. $\arcsin\left(-\frac{\sqrt{3}}{2}\right)$

6b. $\arccos\left(-\frac{\sqrt{3}}{2}\right)$

6c. $\arctan\left(-\frac{1}{\sqrt{3}}\right)$

6d. $\arccos\left(\frac{1}{\sqrt{2}}\right)$

6e. $\arctan(-1)$