Warm up

1. Add and subtract $2\pi$ to each fraction below:
   a) $2\pi/3$  b) $12\pi/13$  c) $9\pi/4$  d) $7\pi/8$

2) Using the unit circle as a reference, name what quadrant each fraction is in:
   a) $13\pi/8$  b) $9\pi/15$  c) $8\pi/9$  d) $11\pi/13$
Objective: Find an equation of a Sin and Cos function given values or graph.

\[ \frac{2\pi}{b} \]

Period = \( \frac{2\pi}{b} \) so \( b = \frac{2\pi}{\text{period}} \)

Phase shift is \(-\frac{c}{b}\) so \( c = -b(\text{phase shift}) \)

\[ -b \cdot (p.s.) \]
1. Find a Cosine function that has a period of $4\pi$ and an amplitude of 3

$$y = \pm 3 \cos \left( \frac{1}{2} \Theta \right) \quad \frac{2\pi}{\frac{1}{2}} = 2$$

2. Sine function with a period of $\pi/2$, a phase shift of $\pi/4$, a vertical shift of 4, and an amplitude of 1/2.

$$y = \pm \frac{1}{2} \sin \left( \left( \Theta - \frac{\pi}{4} \right) \right) + 4 \quad \frac{2\pi}{\frac{\pi}{2}} = 4$$
3. Sine function who has a period of 3, a phase shift of 2, a vertical shift of 3, and an amplitude of 3.

Practice Worksheet
To find coterminal angles you add or subtract $360^\circ$ or $2\pi$

\[-330^\circ \quad 30^\circ \quad 390^\circ\]

\[-\frac{5\pi}{4} \quad \frac{3\pi}{4} \quad \frac{11\pi}{4}\]
Reference angle  an angle that measure the distance from where an angle terminates and the closest x axis.

Steps for finding a reference angle.
1. Find a coterminal angle between 0 and $360^\circ$ or 0 and $2\pi$
2. If terminates in the 1st quadrant it equals itself
3. If terminates in the 2nd quadrant it is $180^\circ - \theta$
4. If terminates in the 3rd quadrant it is $\theta - 180^\circ$
5. If terminates in the 4th quadrant it is $360^\circ - \theta$

\[\begin{array}{c}
\frac{5\pi}{4} \\
\frac{13\pi}{4} \\
\frac{15\pi}{8} \\
\frac{7\pi}{8} \\
\frac{\pi}{4}
\end{array}\]
Objective: Find the trig values for a right triangle.

The six trig functions are

\[ \sin \phi = \frac{\sqrt{12}}{16} \quad \csc \phi = \frac{16}{\sqrt{12}} \]

\[ \cos \phi = \frac{3}{4} \quad \sec \phi = \frac{4}{3} \]

\[ \tan \phi = \frac{\sqrt{12}}{12} \quad \cot \phi = \frac{12}{\sqrt{12}} \]

\[ \sqrt{a^2 + b^2} = c \quad 16^2 + 12^2 = 256 \]
Find the six trig values given one

Examples

1. \( \tan \theta = \frac{7}{5} \)
   \[
   \begin{align*}
   \sin \theta &= \frac{7}{\sqrt{41}} \\
   \cos \theta &= \frac{5}{\sqrt{41}} \\
   \cot \theta &= \frac{5}{7}
   \end{align*}
   \]

2. Secant \( \theta = \frac{7}{3} \)
Evaluate trig functions by a point on the terminal side

1. Find the six trig values of an angle that terminates at (3, -2)
2. Find the six trig values given

\[
\cos \theta = \frac{1}{3} \quad \text{and} \quad \tan \theta < 0
\]

\[
\csc \theta = \frac{4}{3} \quad \text{and} \quad \cot \theta > 0
\]
Wrap up

1) Find one positive and negative coterminal angle for:
   a) -30°   b) 2\pi/3   c) 13\pi/8   d) 245°   e) 7\pi/6

2) What is the reference angle for each angle in #1?

3) Find the six trig values given
   a) \sin\theta = 4/7   and \tan\theta > 0
   b) \sec\theta = 6/5   and \tan\theta < 0