Problem Statements

1. Convert $75^\circ$ to radians.

2. A circular sector created by a central angle of $\frac{3}{5}$ radians has an area of $1080 \text{ ft}^2$, determine the radius of the circle.

3. The planet Neptune has an orbit that is nearly circular. It orbits the Sun at a distance of 4497 million kilometers and completes one revolution every 165 years. How long is a full path of Neptune around the Sun? Then find the linear velocity of Neptune as it orbits the Sun.
4. Evaluate the six trigonometric functions for the following angles:

a) \( \sin \frac{4\pi}{3} \)  
   a) \( \sin 315^\circ \)

b) \( \cos \frac{4\pi}{3} \)  
   b) \( \cos 315^\circ \)

c) \( \tan \frac{4\pi}{3} \)  
   c) \( \tan 315^\circ \)

d) \( \cot \frac{4\pi}{3} \)  
   d) \( \cot 315^\circ \)

e) \( \sec \frac{4\pi}{3} \)  
   e) \( \sec 315^\circ \)

f) \( \csc \frac{4\pi}{3} \)  
   f) \( \csc 315^\circ \)
5. Find the exact value of the six trigonometric functions, given the following:

**hypotenuse** = 29, **side opposite the angle** = 21

6. Given \( \sin \theta = \frac{4}{7} \) and \( \theta \) in Q1, use the trigonometric identities to find the exact value of each:

a. \( \cos(\theta) = \)

b. \( \cot(\theta) = \)

c. \( \csc(\theta) = \)

d. \( \tan(90^\circ - \theta) = \)

7. From a point on the ground 47 feet from the foot of a tree, the angle of elevation of the top of the tree is 30°. Find the height of the tree.
8. Find the exact value of \( x \) and \( y \).

\[
\begin{align*}
45^\circ & \quad 70 \\
\text{y} & \\
\text{x}
\end{align*}
\]

9. Let \((-24, 7)\) be a point on the terminal side of \( \theta \). Find the sine, cosine, and tangent of \( \theta \).

10. Let \((3, -8)\) be a point on the terminal side of \( \theta \). Find the sine, cosine, and tangent of \( \theta \).

11. Given \( \sin(\theta) = -\frac{5}{7} \) and \( \tan(\theta) > 0 \), find \( \tan(\theta) \) and \( \sec(\theta) \).