

Let $\theta = -\frac{28\pi}{6}$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 11 PTS

[a] The smallest positive angle coterminal with θ is $\frac{4\pi}{3}$ radians.

[b] The reference angle for θ is $\frac{\pi}{3}$ radians.

[c] $\cot \theta = \frac{\sqrt{3}}{3}$.

[d] $\sec \theta = -2$.

Suppose $\sin t = -\frac{1}{2}$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 13 PTS

[a] The reference angle for t is $\frac{\pi}{6}$ radians.

[b] t could be in quadrant(s) $3, 4$.

[c] The possible value(s) of t is (are) $\frac{7\pi}{6}, \frac{11\pi}{6}$. **NOTE:** Your answer(s) must be between 0 and 2π .

Prove the identity $(3 \cot t + 2 \csc t)(3 \cot t - 2 \csc t) = 5 \cot^2 t - 4$.

SCORE: ____ / 10 PTS

$$\begin{aligned} & \downarrow \\ &= 9 \cot^2 t - 4 \csc^2 t \\ &= 9 \cot^2 t - 4 (\cot^2 t + 1) \\ &= 9 \cot^2 t - 4 \cot^2 t - 4 = 5 \cot^2 t - 4 \quad \text{QED} \end{aligned}$$

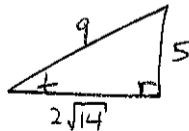
Let t be an acute angle such that $\csc t = \frac{9}{5}$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 8 PTS

[a] Draw a corresponding right angle triangle, and label the lengths of all sides.

[b] $\tan t = \frac{5\sqrt{14}}{28}$

[c] $\cos t = \frac{2\sqrt{14}}{9}$



Let θ be an angle such that $\sin \theta = -\frac{2\sqrt{10}}{7}$ and $\cos \theta = \frac{3}{7}$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 12 PTS

[a] $\sec \theta = \underline{\frac{7}{3}}$.

[b] $\cot \theta = \underline{-\frac{3\sqrt{10}}{20}}$.

[c] $\sec(-\theta) = \underline{\frac{7}{3}}$.

[d] $\csc\left(\frac{\pi}{2} - \theta\right) = \underline{\frac{7}{3}}$.

Suppose $\sec t = \frac{7}{5}$ and $\sin t < 0$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 10 PTS

[a] t is in quadrant 4.

[b] Find the value of $\tan t$ using identities, not triangles. **NOTE:** You must show the proper use of identities to get full credit.

$$\tan^2 t = \sec^2 t - 1$$

$$= \frac{49}{25} - 1$$

$$= \frac{24}{25}$$

$$\longrightarrow \tan t = -\frac{2\sqrt{6}}{5}$$

Fill in the blanks.

SCORE: _____ / 6 PTS

[a] An angle of $\frac{34\pi}{9}$ radians has a reference angle of $\frac{2\pi}{9}$ radians. $3\frac{7}{9}\pi - 2\pi = 1\frac{7}{9}\pi$ IN Q_4

[b] $\csc(-31.1) = 3.2186$. Round your answer to 4 decimal places.

The blades of a wind turbine are 107 feet long and rotate at 14 revolutions per minute.

SCORE: ____ / 8 PTS

- [a] Find the angular speed of the blades. State the units of your final answer. Round your answer to 2 decimal places.

$$\frac{14 \text{ REV}}{\text{MIN}} \cdot \frac{2\pi \text{ RAD}}{1 \text{ REV}} = 28\pi \frac{\text{RAD}}{\text{MIN}} \approx 87.96 \text{ RAD/MIN}$$

- [b] Find the linear speed of the tips of the blades. State the units of your final answer. Round your answer to 2 decimal places.

$$107 \text{ FT} \cdot \frac{28\pi \text{ RAD}}{\text{MIN}} = 2996\pi \frac{\text{RAD}}{\text{MIN}} \approx 9412.21 \text{ RAD/MIN}$$

A sector is cut from a pie of radius 8.2 inches. Find the area of the sector if the central angle is 1.3 radians.

SCORE: _____ / 4 PTS

State the units of your final answer. Round your answer to 2 decimal places.

$$\frac{1}{2} (8.2 \text{ in})^2 (1.3) \approx 43.71 \text{ in}^2$$

You are standing in an elevator on the side of a building. Your friend is waiting outside the building, 37 feet from the base of the elevator. If the angle of depression from you to your friend is 81° , what is the distance from you to your friend? SCORE: _____ / 10 PTS

State the units of your final answer. Round your answer to 2 decimal places.



$$\cos 81^\circ = \frac{37 \text{ FT}}{x}$$

$$x = \frac{37 \text{ FT}}{\cos 81^\circ} \approx 236.52 \text{ FT}$$