

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

SCORE: _____ / 13 PTS

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

[b] t could be in quadrant(s) $2, 3$.

[c] The possible value(s) of t is (are) $\frac{2\pi}{3}, \frac{4\pi}{3}$. **NOTE:** Your answer(s) must be between 0 and 2π .

Let $\theta = -\frac{50\pi}{6}$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 11 PTS

[a] The smallest positive angle coterminal with θ is $\frac{5\pi}{3}$ radians.

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

[c] $\sec \theta = 2$.

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

Let θ be an angle such that $\sin \theta = -\frac{2\sqrt{14}}{9}$ and $\cos \theta = \frac{5}{9}$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 12 PTS

[a] $\sec \theta = \frac{9}{5}$

[b] $\cot \theta = -\frac{5\sqrt{14}}{28}$

[c] $\sec(-\theta) = \frac{9}{5}$

[d] $\csc\left(\frac{\pi}{2} - \theta\right) = \frac{9}{5}$

Suppose $\csc t = \frac{9}{7}$ and $\cos t < 0$. Fill in the blanks below. Simplify all answers.

SCORE: ____ / 10 PTS

[a] t is in quadrant 2.

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

$$\cot^2 t = \csc^2 t - 1$$

$$= \frac{81}{49} - 1$$

$$= \frac{32}{49} \rightarrow \cot t = -\frac{4\sqrt{2}}{7}$$

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

SCORE: _____ / 10 PTS

$$\begin{aligned} & \downarrow \\ & = 9 \sec^2 t - 4 \tan^2 t \\ & = 9 \sec^2 t - 4(\sec^2 t - 1) \\ & = 9 \sec^2 t - 4 \sec^2 t + 4 = 5 \sec^2 t + 4 \end{aligned}$$

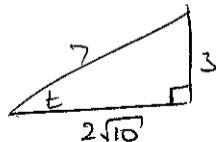
Let t be an acute angle such that $\csc t = \frac{7}{3}$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 8 PTS

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

[b] $\tan t = \frac{3\sqrt{10}}{20}$.

[c] $\cos t = \frac{2\sqrt{10}}{7}$.



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.

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

Fill in the blanks.

SCORE: _____ / 6 PTS

[a] An angle of $\frac{18\pi}{7}$ radians has a reference angle of $\frac{3\pi}{7}$ radians. $2\frac{4}{7}\pi - 2\pi = \frac{4}{7}\pi \in Q_2$

[b] $\sec(-30.1) = 3.9664$. Round your answer to 4 decimal places.

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.



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

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

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.

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