Suppose $\sin t = -\frac{\sqrt{3}}{2}$. 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) 3, 4.

[c] The possible value(s) of t is (are) $\frac{4\pi}{3}, \frac{5\pi}{3}$. **NOTE**: Your answer(s) must be between 0 and 2π.

Let $\theta = -\frac{52\pi}{6}$. 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] $\csc\theta = \frac{-2\sqrt{3}}{3}$.

[d] $\tan\theta = \sqrt{3}$.

Let θ be an angle such that $\sin\theta = -\frac{4\sqrt{2}}{9}$ and $\cos\theta = \frac{7}{9}$. Fill in the blanks below. Simplify all answers. **SCORE: ____ / 12 PTS**

[a] $\sec\theta =$ $\frac{9}{7}$.

[b] $\cot\theta =$ $-\frac{7\sqrt{2}}{8}$.

[c] $\sec(-\theta) =$ $\frac{9}{7}$.

[d] $\csc(\frac{\pi}{2} - \theta) =$ $\frac{9}{7}$.

Suppose $\csc t = \frac{7}{3}$ 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.

$$\cot^2 t = \csc^2 t - 1$$
$$= \frac{49}{9} - 1$$
$$= \frac{40}{9} \longrightarrow \cot t = -\frac{2\sqrt{10}}{3}$$

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

SCORE: _____ / 10 PTS

$$= 9\tan^2 t - 4\sec^2 t$$

$$= 9\tan^2 t - 4(\tan^2 t + 1)$$

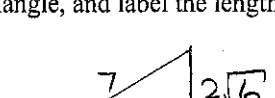
$$= 9\tan^2 t - 4\tan^2 t - 4 = 5\tan^2 t - 4 \quad \text{QED}$$

Let t be an acute angle such that $\sec t = \frac{7}{5}$. 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] $\sin t =$ $\frac{2\sqrt{6}}{7}$.

[c] $\cot t =$ $\frac{5\sqrt{6}}{12}$.



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.

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

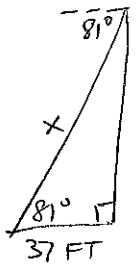
Fill in the blanks. **SCORE: ____ / 6 PTS**

[a] An angle of $\frac{23\pi}{9}$ radians has a reference angle of $\frac{4\pi}{9}$ radians. $\frac{23}{9}\pi - 2\pi = \frac{5}{9}\pi$ IN Q_2

[b] $\csc(-30.1) =$ 1.0334 . 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 ? State the units of your final answer. Round your answer to 2 decimal places.

SCORE: _____ / 10 PTS



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

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

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.

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