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

SCORE: ____ / 10 PTS

$= 9\csc^2 t - 4\cot^2 t$

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

$= 9\csc^2 t - 4\csc^2 t + 4 = 5\csc^2 t + 4$ QED

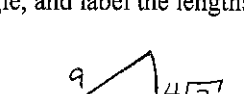
Let t be an acute angle such that $\sec t = \frac{9}{7}$. Fill in the blanks below. Simplify all answers.

SCORE: ____ / 8 PTS

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

[b] $\sin t =$ $\frac{4\sqrt{2}}{9}$.

[c] $\cot t =$ $\frac{7\sqrt{2}}{8}$.



Let θ be an angle such that $\sin\theta = -\frac{2\sqrt{6}}{7}$ and $\cos\theta = \frac{5}{7}$. Fill in the blanks below. Simplify all answers. **SCORE: ____ / 12 PTS**

[a] $\sec\theta =$ $\frac{7}{5}$.

[b] $\cot\theta =$ $\frac{-5\sqrt{6}}{12}$.

[c] $\sec(-\theta) =$ $\frac{7}{5}$.

[d] $\csc(\frac{\pi}{2} - \theta) =$ $\frac{7}{5}$.

Suppose $\sec t = \frac{9}{5}$ 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.

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

$$= \frac{81}{25} - 1$$

$$= \frac{56}{25} \longrightarrow \tan t = -\frac{2\sqrt{14}}{5}$$

A sprinkler on a golf course fairway sprays water over a distance of 72 feet and rotates through an angle of 2.9 radians. Find the area of the fairway watered by the sprinkler. State the units of your final answer. Round your answer to 2 decimal places.

SCORE: _____ / 4 PTS

$\frac{1}{2}(72\ FT)^2(2.9) = 7516.8\ FT^2$

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

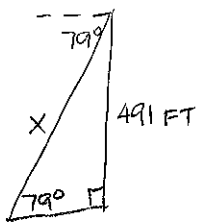
[a] An angle of $\frac{18\pi}{7}$ radians has a reference angle of $\frac{3\pi}{7}$ radians. $2\frac{4}{7}\pi - 2\pi = \frac{4}{7}\pi$ IN Q_2

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

A surveyor is standing near the base of a 491 foot tall monument. If the angle of depression from the top of the monument to the surveyor is 79°, what is the distance from the surveyor to the top of the monument?

SCORE: _____ / 10 PTS

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



$$\sin 79^\circ = \frac{491\,FT}{X}$$

$$X = \frac{491\,FT}{\sin 79^\circ} \approx 500.19\,FT$$

A vinyl record with a radius of 12 inches rotates at 33 revolutions per minute. **SCORE: _____ / 8 PTS**

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

$$\frac{33 \text{ REV}}{\text{MIN}} \cdot \frac{2\pi \text{ RAD}}{\text{REV}} = 66\pi \frac{\text{RAD}}{\text{MIN}} \approx 207.35 \text{ RAD/MIN}$$

[b] Find the linear speed of a point on the outer edge of the record.
State the units of your final answer. Round your answer to 2 decimal places.

$$12 \text{ IN} \cdot \frac{66\pi \text{ RAD}}{\text{MIN}} = 792\pi \frac{\text{IN}}{\text{MIN}} \approx 2488.14 \text{ IN/MIN}$$