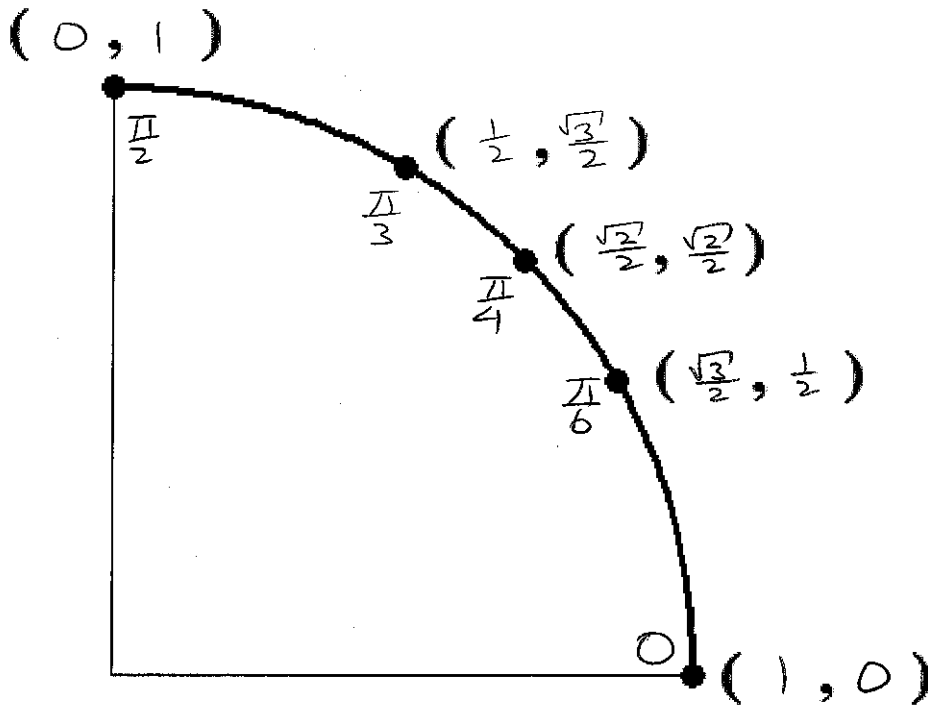


Complete the first quadrant portion of the unit circle below. Simplify all answers.
 Inside the circle, label the radian measure of each point.
 Outside the circle, label the corresponding x - and y -coordinates of each point.

SCORE: ____ / 8 PTS
 (2 POINTS OFF
 FOR EACH ERROR)



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 or 4.

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

Let $\theta = -\frac{22\pi}{4}$. Fill in the blanks below. Simplify all answers.

SCORE: ____ / 11 PTS

[a] θ is coterminal with $\frac{\pi}{2}$ radians. **NOTE:** Your answer must be between 0 and 2π . $-\frac{11\pi}{2} + 6\pi$

[b] The reference angle for θ is $\frac{\pi}{2}$ radians.

[c] $\cot \theta = \frac{0}{1}$

[d] $\csc \theta = \frac{1}{1}$

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

SCORE: ____ / 12 PTS

- [a] $\csc \theta = \frac{-\frac{9}{7}}{\frac{1}{-\frac{7}{9}}}$
- [b] $\cos(-\theta) = \frac{4\sqrt{2}}{9} \cdot \cos \theta$
- [c] $\tan \theta = \frac{-\frac{7\sqrt{2}}{8}}{\frac{4\sqrt{2}}{9}} = -\frac{7}{4\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$
- [d] $\sec(\frac{\pi}{2} - \theta) = \frac{-\frac{9}{7}}{\csc \theta}$

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. $y > 0, x < 0$
- [b] Find the value of $\cot t$ using identities, **not triangles**. **NOTE:** You must show the proper use of identities to get full credit.

$$\begin{aligned} \cot^2 t &= \csc^2 t - 1 \\ &= \frac{49}{9} - 1 \\ &= \frac{40}{9} \end{aligned} \quad \cot t = -\frac{2\sqrt{10}}{3} \text{ SINCE } \cot t < 0 \text{ IN } Q_2$$

Prove the identity $(3 + \sec t)(3 - \sec t) = 8 - \tan^2 t$.

SCORE: ____ / 10 PTS

$$\begin{aligned} &\downarrow \\ &= 9 - \sec^2 t \\ &= 9 - (1 + \tan^2 t) \\ &= 8 - \tan^2 t \end{aligned}$$

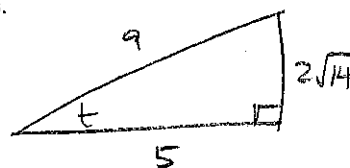
Let t be an acute angle such that $\sec t = \frac{9}{5}$. Fill in the blanks below. Simplify all answers.

SCORE: ____ / 8 PTS

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

[b] $\sin t = \frac{2\sqrt{14}}{9}$

[c] $\cot t = \frac{5\sqrt{14}}{28} \cdot \frac{5}{2\sqrt{14}} \cdot \frac{\sqrt{14}}{\sqrt{14}}$



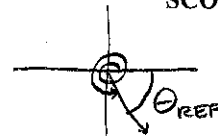
$$\begin{aligned} \sqrt{9^2 - 5^2} &= \sqrt{81 - 25} \\ &= \sqrt{56} \\ &= 2\sqrt{14} \end{aligned}$$

Fill in the blanks.

SCORE: ____ / 6 PTS

[a] An angle of $\frac{25\pi}{7}$ radians has a reference angle of $\frac{3\pi}{7}$ radians.

$3\frac{4}{7}\pi$

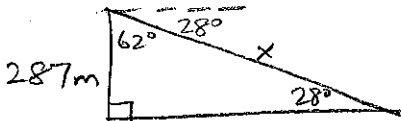


[b] $\sec(-17.8) = 2.0082$. Round your answer to 4 decimal places.

A funicular transports passengers from the entrance of a cave to the bottom of the cave along an inclined track. SCORE: ____ / 10 PTS

The bottom of the cave is 287 meters lower than the entrance, and is at an angle of depression of 28° from the entrance.

How long is the funicular's track? Show proper work. State the units of your final answer. Round your answer to 2 decimal places.



$$\begin{aligned} \sin 28^\circ &= \frac{287 \text{ m}}{X} \longrightarrow X = \frac{287 \text{ m}}{\sin 28^\circ} \\ \text{or} \\ \cos 62^\circ & \approx 611.33 \text{ m} \end{aligned}$$

A merry-go-round is spinning at 10 revolutions per minute, and its outer edge has a linear speed of 600 feet per minute.

SCORE: ____ / 12 PTS

[a] Find the angular speed of the edge of the merry-go-round, and the radius of the merry-go-round. Show proper work. State the units of your final answers. Round your answer to 2 decimal places.

$$10 \text{ REVOLUTIONS} = 10 \cdot 2\pi^R = 20\pi^R$$

$$\omega = \frac{20\pi^R}{\text{MINUTE}}$$

$$v = r\omega \longrightarrow r = \frac{v}{\omega} = \frac{600 \text{ FT}}{\text{MINUTE}} \cdot \frac{\text{MINUTE}}{20\pi^R} = \frac{30}{\pi} \text{ FT} \approx 9.55 \text{ FT}$$

[b] A sector of the merry-go-round was painted red, and had an area of 68 square feet. Find the central angle of the red sector. Show proper work. State the units of your final answer. Round your answers to 2 decimal places.

$$A = \frac{1}{2} r^2 \theta^R$$

$$\theta^R = \frac{2A}{r^2} = \frac{2(68 \text{ FT}^2)}{(9.55 \text{ FT})^2} \approx 1.49^R$$