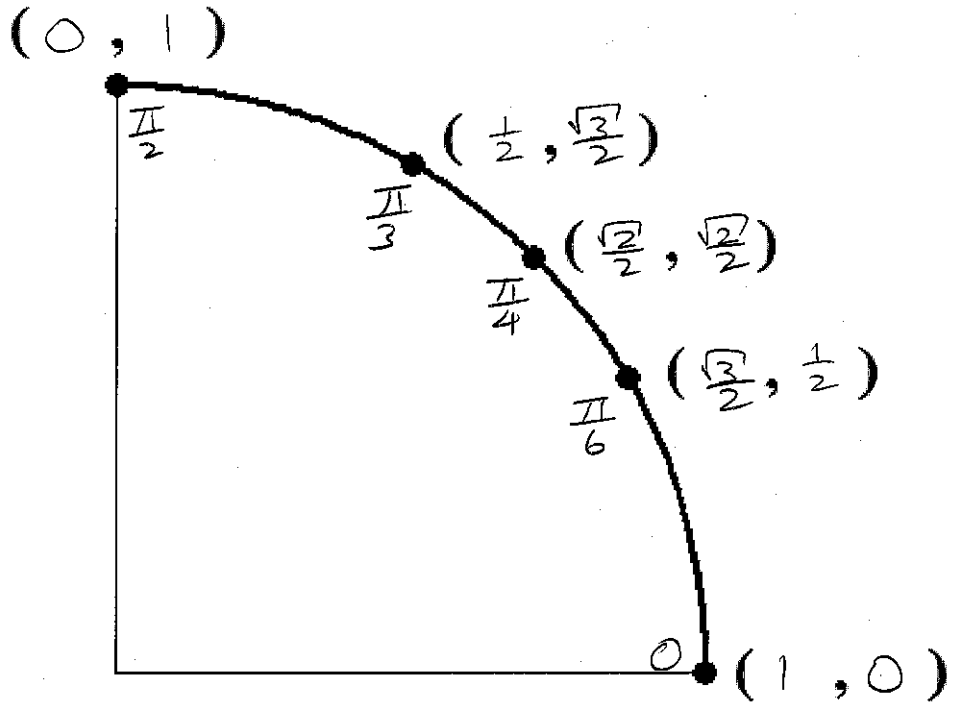
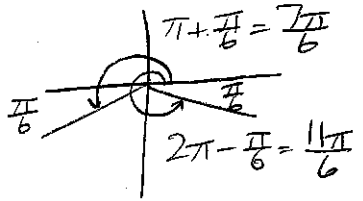
Complete the first quadrant portion of the unit circle below.
Inside the circle, label the radian measure of each point.
Outside the circle, label the corresponding $x-$ and $y-$ coordinates of each point.

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



Suppose $\sin t = -\frac{1}{2}$. 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. $y < 0$

[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.

Let $\theta = -\frac{20\pi}{6}$. Fill in the blanks below. Simplify all answers. $-3\frac{1}{3}\pi$

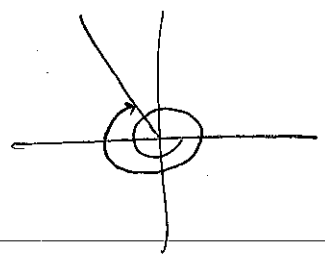
SCORE: ____ / 11 PTS

[a] θ is coterminal with $\frac{2\pi}{3}$ radians. **NOTE**: Your answer must be positive.

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

[c] $\cot\theta = -\frac{\sqrt{3}}{3}$. $\quad -\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{2}\cdot\frac{2}{\sqrt{3}} = -\frac{1}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

[d] $\csc\theta = \frac{2\sqrt{3}}{3}$. $\quad \frac{1}{\frac{\sqrt{3}}{2}} = \frac{2}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$



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

SCORE: _____ / 10 PTS

$= 4 - \csc^2 t$

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

$= 3 - \cot^2 t$

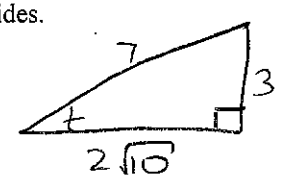
Let t be an acute angle such that $\csc t = \frac{7}{3}$. Fill in the blanks below. Simplify all answers.

SCORE: _____ / 8 PTS

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

[b] $\tan t =$ $\frac{3\sqrt{10}}{20}$. $\frac{3}{2\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{3\sqrt{10}}{20}$

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



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

SCORE: _____ / 12 PTS

[a] $\tan\theta =$ $-\frac{4\sqrt{2}}{7}$. $\frac{\frac{4\sqrt{2}}{9}}{-\frac{7}{9}} = \frac{4\sqrt{2}}{9} \cdot -\frac{9}{7} = -\frac{4\sqrt{2}}{7}$

[b] $\sec\theta =$ $-\frac{9}{7}$. $\frac{1}{-\frac{7}{9}} = -\frac{9}{7}$

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

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

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. $x > 0, y < 0$

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

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

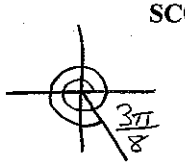
$1 + \tan^2 t = \frac{49}{25}$

$\tan^2 t = \frac{24}{25}$

$\tan t = -\frac{2\sqrt{6}}{5}$ SINCE $\tan t < 0$ IN Q_4

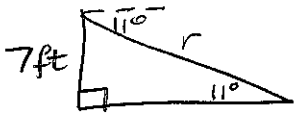
Fill in the blanks. **SCORE: ____ / 6 PTS**

[a] An angle of $\frac{29\pi}{8}$ radians has a reference angle of $\frac{3\pi}{8}$ radians. $3\frac{5}{8}\pi$



[b] $\sec(-17.3) = 47.0836$. Round your answer to 4 decimal places.

A ramp descends from a raised platform to the ground 7 feet below. If the angle of depression of the ramp is 11°, how long is the ramp ? Show proper work. State the units of your final answer. Round your answer to 2 decimal places. **SCORE: ____ / 10 PTS**



$\sin 11° = \frac{7}{r}$

$r = \frac{7}{\sin 11°} = 36.69$ FEET

AJ baked a pizza using a rotating pizza oven, and took a sector of it to work. **SCORE: ____ / 12 PTS**

[a] The sector had an area 168 square inches, and was intercepted by a central angle of 2.4 radians. What was the radius of the pizza ? Show proper work. State the units of your final answer. Round your answer to 2 decimal places.

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

$168 = \frac{1}{2}r^2(2.4)$

$r^2 = 140$

$r = 11.83$ INCHES

[b] The pizza oven made one revolution every 11 seconds. Find the linear and angular speeds of the edge of the pizza. Show proper work. State the units of your final answer. Round your answers to 2 decimal places.

ANGULAR SPEED $= \omega = \frac{1 \text{ REVOLUTION}}{11 \text{ SECONDS}} \cdot \frac{2\pi \text{ RADIANS}}{1 \text{ REVOLUTION}} = 0.57 \frac{\text{RADIANS}}{\text{SECOND}}$

LINEAR SPEED $= V = r\omega = 11.83 \text{ INCHES} \cdot \frac{0.57 \text{ RADIANS}}{\text{SECOND}}$

$= 6.74$ INCHES/SECOND