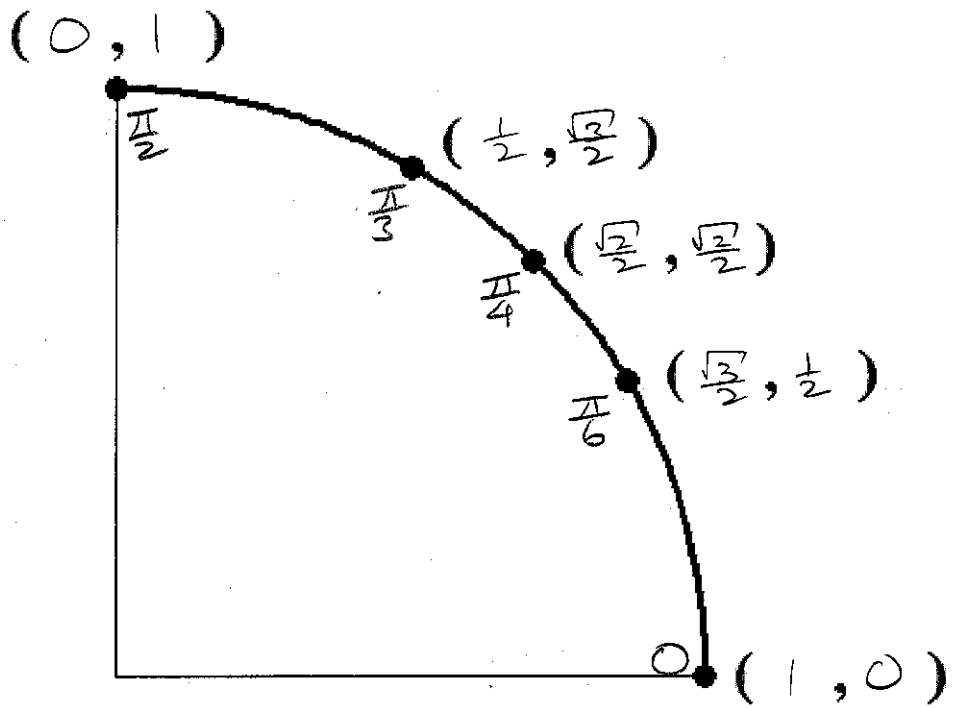
Complete the first quadrant portion of the unit circle below.
Inside the circle, label the radian measure of each point.
Outside the circle, label the corresponding $x-$ and $y-$ coordinates of each point.

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



Let $\theta = -\frac{16\pi}{6}$. Fill in the blanks below. Simplify all answers. $-2\frac{2}{3}\pi$

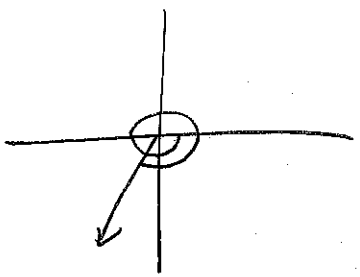
SCORE: ____ / 11 PTS

[a] θ is coterminal with $\frac{4\pi}{3}$ radians. **NOTE**: Your answer must be positive.

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

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

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



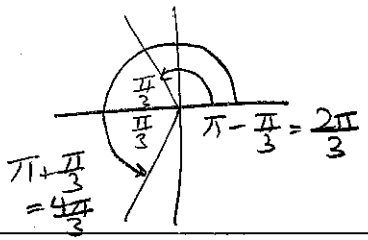
Suppose $\cos t = -\frac{1}{2}$. Fill in the blanks below. Simplify all answers.

SCORE: ____ / 13 PTS

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

[b] t could be in quadrant(s) 2, 3. $x < 0$

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

[a] $\tan\theta =$ $-\frac{2\sqrt{6}}{5}$. $\frac{\frac{2\sqrt{6}}{7}}{-\frac{5}{7}} = \frac{2\sqrt{6}}{7} \cdot \frac{7}{5} = -\frac{2\sqrt{6}}{5}$

[b] $\sec\theta =$ $-\frac{7}{5}$. $\frac{1}{-\frac{5}{7}} = -\frac{7}{5}$

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

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

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. $x<0, y>0$

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

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

$1 + \cot^2 t = \frac{81}{49}$

$\cot^2 t = \frac{32}{49}$

$\cot t = -\frac{4\sqrt{2}}{7}$ SINCE $\cot t < 0$ IN Q_2

Prove the identity $(2 + \tan t)(2 - \tan t) = 5 - \sec^2 t$. **SCORE: ____ / 10 PTS**

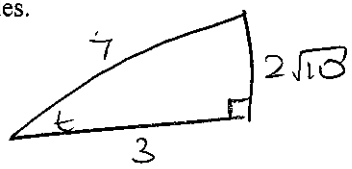
$= 4 - \tan^2 t$

$= 4 - (\sec^2 t - 1)$

$= 5 - \sec^2 t$

Let t be an acute angle such that $\sec t = \frac{7}{3}$. 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.

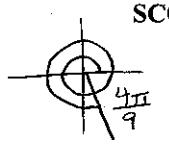


[b] $\sin t =$ $\frac{2\sqrt{10}}{7}$.

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

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

[a] An angle of $\frac{32\pi}{9}$ radians has a reference angle of $\frac{4\pi}{9}$ radians. $3\frac{5}{9}\pi$



[b] $\csc(-18.3) =$ 1.9146 . Round your answer to 4 decimal places.

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 153 square inches, and was intercepted by a central angle of 2.7 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.

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

$153 = \frac{1}{2}r^2(2.7)$

$r^2 = \frac{340}{3}$

$r = 10.65$ INCHES

[b] The pizza oven made one revolution every 13 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 $= \omega = \frac{1 \text{ REVOLUTION}}{13 \text{ SECONDS}} \cdot \frac{2\pi \text{ RADIANS}}{1 \text{ REVOLUTION}} = 0.48 \frac{\text{RADIANS}}{\text{SECOND}}$

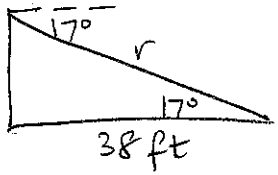
LINEAR SPEED $= V = r\omega = 10.65 \text{ INCHES} \cdot 0.48 \frac{\text{RADIANS}}{\text{SECOND}}$

$= 5.11$ INCHES/SECOND

A ramp descends from a raised platform to a point on the ground 38 feet from the base of the platform. **SCORE: ____ / 10 PTS**

If the angle of depression of the ramp is 17°, how long is the ramp ?

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



$\cos 17^\circ = \frac{38}{r}$

$r = \frac{38}{\cos 17^\circ} = 39.74$ FEET