NAME _____

MATH 114: FALL 2021	QUIZ 1

You may use your homework solutions. I need to look at your class notes while you take this. You are allowed a 3x5 inch card of formulas. Thanks!

Problem 1: Suppose $\theta = \pi/8$ (in radians). Convert this angle to degrees.

$$\Theta = \left(\frac{\pi}{8}\,\text{rad}\right)\left(\frac{180^\circ}{\pi\,\text{rad}}\right) = \frac{180}{8}\,\text{deg.} = \boxed{22.5^\circ}$$

Problem 2: Consider a circular arc which sweeps through a 120° arc. If the radius of the circle is $20\,cm$ then find:

(a.) the arclength of the arc,

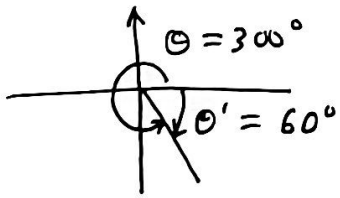
$$\Theta = (120^\circ)\left(\frac{2\pi\,\text{rad}}{360^\circ}\right) = \frac{2\pi}{3}\,\text{rad.}$$

$$S = r\Theta = (20\,\text{cm})\left(\frac{2\pi}{3}\right) = \frac{40\pi}{3}\,\text{cm} \cong \boxed{41.89\,\text{cm}}$$

(b.) the area of the sector,

$$A = \frac{1}{2}\Theta r^2 = \frac{1}{2}\left(\frac{2\pi}{3}\right)(20\text{cm})^2 = \frac{400\pi}{3}\,(\text{cm})^2 = \boxed{418.9\,(\text{cm})^2}$$

Problem 3: Find the reference angle of $\theta = 300^\circ$,



$\Theta' = 360^\circ - \Theta$ since in quad. IV

$\therefore$ $\boxed{\Theta' = 60^\circ}$

Problem 4: If $\cos t = 1/3$ and t is an angle in quadrant III then find the exact value of $\sin t$.

II	I
III	IV

Notice $\cos t, \sin t < 0$ in III so...

SORRY! You all should have asked me why $\cos t = \frac{1}{3}$ in III. (it's impossible!)

Anyway, let's suppose $\cos t = \frac{-1}{3}$ and t is in quad. III,

$$\sin^2 t + \cos^2 t = 1 \quad \Rightarrow \quad \sin t = \pm\sqrt{1 - \cos^2 t}$$

$$\Rightarrow \sin t = -\sqrt{1 - (-1/3)^2} = -\sqrt{\frac{9-1}{9}} = \boxed{-\frac{2\sqrt{2}}{3}}$$