

NAME: Solution

MAC 2311
Quiz One Sample

Please show all of your work in a NEAT and ORGANIZED fashion.

1. (2 points) Solve for x and write your answer in interval notation:

$$\begin{aligned} |1 - \frac{x}{3}| &\geq 2 \\ 1 - \frac{x}{3} &\geq 2 \quad \text{or} \quad 1 - \frac{x}{3} \leq -2 \\ -\frac{x}{3} &\geq 1 \quad \text{or} \quad -\frac{x}{3} \leq -3 \\ x &\leq -3 \quad \text{or} \quad x \geq 9 \end{aligned}$$

$$\boxed{(-\infty, -3] \cup [9, \infty)}$$

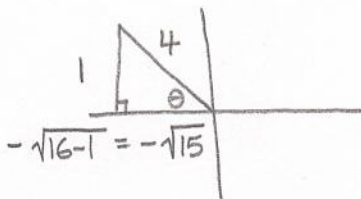
2. (2 points) Find all x in the interval $[0, 2\pi)$ so that

$$\begin{aligned} \sec^2 x - \tan x - 1 &= 0 \\ \cancel{1} + \tan^2 x - \tan x - \cancel{1} &= 0 \\ \tan^2 x - \tan x &= 0 \\ \tan x (\tan x - 1) &= 0 \\ \tan x = 0 \quad \text{or} \quad \tan x = 1 \end{aligned}$$

$$\boxed{x = 0, \pi; \frac{\pi}{4}, \frac{5\pi}{4}}$$

$$\boxed{1 + \tan^2 x = \sec^2 x}$$

3. (2 points) If θ is in quadrant II and $\sin \theta = \frac{1}{4}$, find $\cos \theta$ and $\cos 2\theta$.



$$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \boxed{-\frac{\sqrt{15}}{4}}$$

$$\begin{aligned} \cos 2\theta &= 2\cos^2 \theta - 1 \\ &= 2\left(-\frac{\sqrt{15}}{4}\right)^2 - 1 \\ &= 2\left(\frac{15}{16}\right) - 1 \\ &= \frac{15}{8} - 1 \\ &= \boxed{\frac{7}{8}} \end{aligned}$$

OR

$$\begin{aligned} \cos 2\theta &= 1 - 2\sin^2 \theta \\ &= 1 - 2\left(\frac{1}{4}\right)^2 \\ &= 1 - 2\left(\frac{1}{16}\right) \\ &= 1 - \frac{1}{8} \\ &= \boxed{\frac{7}{8}} \end{aligned}$$