

NAME: Solution

MAC 2311 Section 3071
Quiz One

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:

$$\begin{aligned}\frac{1}{x+3} + \frac{1}{x+2} &\geq 0 \\ \frac{x+2 + x+3}{(x+3)(x+2)} &\geq 0 \\ \frac{2x+5}{(x+3)(x+2)} &\geq 0\end{aligned}$$
$$\boxed{(-3, -\frac{5}{2}] \cup (-2, \infty)}$$

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

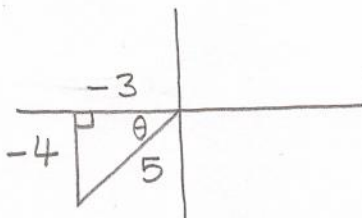
$$\begin{aligned}2\sin^2 x + \cos x - 1 &= 0 \\ 2(1 - \cos^2 x) + \cos x - 1 &= 0 \\ 2 - 2\cos^2 x + \cos x - 1 &= 0 \\ -2\cos^2 x + \cos x + 1 &= 0 \\ 2\cos^2 x - \cos x - 1 &= 0 \\ (2\cos x + 1)(\cos x - 1) &= 0 \\ \cos x = -\frac{1}{2} \text{ or } \cos x = 1\end{aligned}$$

$$\boxed{x = \frac{2\pi}{3}, \frac{4\pi}{3}; 0}$$

$$\begin{aligned}\sin^2 x + \cos^2 x &= 1 \\ \sin^2 x &= 1 - \cos^2 x\end{aligned}$$

3. (2 points) If θ is in quadrant III and $\cos \theta = -\frac{3}{5}$, find $\sin \theta$ and $\sin 2\theta$.

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \boxed{-\frac{4}{5}}$$



$$\begin{aligned}\sin 2\theta &= 2\sin \theta \cos \theta \\ &= 2\left(-\frac{4}{5}\right)\left(-\frac{3}{5}\right) \\ &= \boxed{\frac{24}{25}}\end{aligned}$$