Name Mike Date _____

Math 112: #17 A/B/C/D

A) Find ***all*** the solutions in $[0, 2\pi)$ to the equation $2\sin^2 x - \cos x = 1$.

$2(1-\cos^2 x) - \cos x = 1$

$2 - 2\cos^2 x - \cos x = 1$

$-2 + 2\cos^2 x + \cos x \quad -2 + 2\cos^2 x + \cos x$

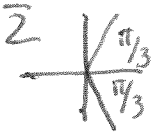
$0 = 2\cos^2 x + \cos x - 1$

$0 = (2\cos x - 1)(\cos x + 1)$

$2\cos x - 1 = 0 \qquad \cos x + 1 = 0$

$\cos x = \frac{1}{2} \qquad \cos x = -1$

$\pi/3, 5\pi/3 \qquad \pi$



$x = \pi/3, \pi, 5\pi/3$

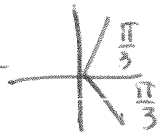
B) Find ***all*** the solutions in $[0, 2\pi)$ to the equation $2\cos^2 x - 7\cos x = -3$.

$2\cos^2 x - 7\cos x + 3 = 0$

$(2\cos x - 1)(\cos x - 3) = 0$

$2\cos x - 1 = 0 \qquad \cos x - 3 = 0$

$\cos x = \frac{1}{2} \qquad \cos x = 3$



no solution

$\frac{\pi}{3}, \frac{5\pi}{3}$

C) Find ***all*** the solutions in $[0, 2\pi)$ to the equation $2\cos^2 x + \sin x = 1$.

$2(1-\sin^2 x) + \sin x = 1$

$2 - 2\sin^2 x + \sin x = 1$

$-2 \quad +2\sin^2 x \quad -\sin x \quad -2 + 2\sin^2 x - \sin x$

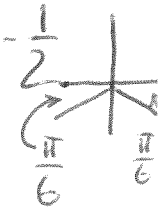
$0 = 2\sin^2 x - \sin x - 1$

$0 = (\sin x - 1)(2\sin x + 1)$

$\sin x - 1 = 0$ $\qquad$ $2\sin x + 1 = 0$

$\sin x = 1$ $\qquad$ $\sin x = -\frac{1}{2}$

$x = \frac{\pi}{2}$ $\qquad$ $x = \frac{7\pi}{6}$



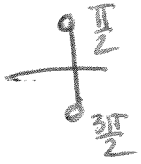
$x = \frac{11\pi}{6}$

$\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

D) Find ***all*** the solutions in $[0, 2\pi)$ to the equation $2\sin x \cos x - \sqrt{3}\cos x = 0$

$\cos x(2\sin x - \sqrt{3}) = 0$

$\cos x = 0$ $\qquad$ $2\sin x - \sqrt{3} = 0$



$x = \frac{\pi}{2}$ $\qquad$ $\sin x = \frac{\sqrt{3}}{2}$

$\frac{\pi}{3}, \frac{2\pi}{3}$

$\frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{2}$