Supplemental ws #3

① $2\sin^2 x + \sin x = 0$

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

$\sin x = 0$ or $2\sin x + 1 = 0$

$x = \boxed{0, 180°, 360°}$

$2\sin x = -1$

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

$x = \boxed{210°, 330°}$

② $2\sin^2 x - \sin x = 0$

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

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

$x = \boxed{0, \pi, 2\pi}$

$2\sin x = 1$

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

$x = \boxed{\frac{\pi}{6}, \frac{5\pi}{6}}$

③ a) $4\cos^2 x = 1$

$\cos^2 x = \frac{1}{4}$

$\cos x = \pm\frac{1}{2}$

$\cancel{\cos x = \frac{1}{2}}$

not valid since interval is

$\frac{\pi}{2} \le x \le \frac{3\pi}{2}$

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

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

③ b) $2\cos^2 x - 5\cos x - 3 = 0$

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

$2\cos x + 1 = 0$ or $\cos x - 3 = 0$

$2\cos x = -1$ $\quad\quad$ $\cos x = 3$

$\cos x = -\frac{1}{2}$ $\quad\quad$ no solution

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

c) $2\sin x + \sqrt{3} = 0$

$2\sin x = -\sqrt{3}$

$\sin x = -\frac{\sqrt{3}}{2}$ ← QIII only

$x = \boxed{\frac{4\pi}{3}}$

④ $2\cos^2\frac{\pi}{6} - 1 = \cos^2\frac{\pi}{6} - \sin^2\frac{\pi}{6}$

$2\left(\frac{\sqrt{3}}{2}\right)^2 - 1 = \left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{1}{2}\right)^2$

$2\left(\frac{3}{4}\right) - 1 = \frac{3}{4} - \frac{1}{4}$

$\frac{3}{2} - 1 = \frac{1}{2}$

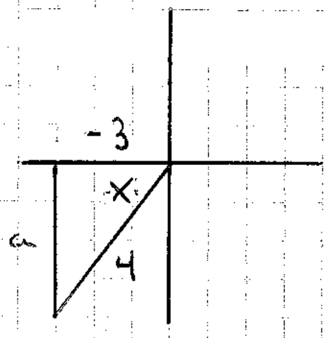
$\frac{1}{2} = \frac{1}{2}$

5) $4\cos x + 3 = 0$

$4\cos x = -3$

$\cos x = \frac{-3}{4}$

since $\cos x$ is negative and $\tan x$ is positive, x must be in Q. III



$a^2 + (-3)^2 = 4^2$

$a = \sqrt{16-9}$

$a = -\sqrt{7}$

$\boxed{\sin x = -\frac{\sqrt{7}}{4}}$

6) $\sin\left(\frac{-47\pi}{2}\right) \cdot \cos(-47\pi)$

$\frac{-47\pi}{2}$ is coterminal with $\frac{-3\pi}{2}$ $\left(\text{or } \frac{\pi}{2}\right)$

-47π is coterminal with $-\pi$ (or π)

$= \sin\left(\frac{\pi}{2}\right) \cdot \cos(\pi)$

$= (1)(-1)$

$= \boxed{-1}$