Trig Review #3

① $\cos 2x - 3\cos x - 3 - \cos^2 x - \sin^2 x = 0$

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

$2\cos^2 x - 3\cos x - 5 = 0$

Let $w = \cos x$

$2w^2 - 3w - 5 = 0$

$(2w - 5)(w + 1) = 0$

$(2\cos x - 5)(\cos x + 1) = 0$

$\cos x = \frac{5}{2}$ $\quad$ $\cos x = -1$

↑ not possible $\quad$ $\boxed{x = \pi}$

② a. $2\cos 2\theta + 4\cos\theta + 3 =$

$2(2\cos^2\theta - 1) + 4\cos\theta + 3 =$

$4\cos^2\theta - 2 + 4\cos\theta + 3 =$

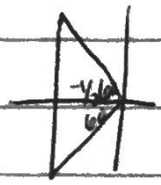
$4\cos^2\theta + 4\cos\theta + 1$

b. $4\cos^2\theta + 4\cos\theta + 1 = 0$

$(2\cos\theta + 1)(2\cos\theta + 1) = 0$

i. only 1 value for $\cos\theta$

ii. $\cos\theta = -\frac{1}{2}$ $\quad$ $\theta = 120°, 240°, -120°, -240°$



c. omit, for now...

③ a. $2\sin^2 x - \cos x - 1 = 0$

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

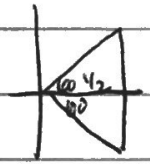
$2 - 2\cos^2 x - \cos x - 1 = 0$

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

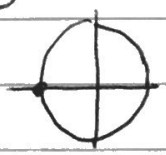
b. Let $w = \cos x$ $\quad 2w^2 + w - 1 = 0$

$(2w-1)(w+1) = 0$

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

c. 

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



$x = 60°, 300°, 180°$

④ a. $3\sin^2 x + 4\cos x =$

$3(1-\cos^2 x) + 4\cos x =$

$3 - 3\cos^2 x + 4\cos x =$

$-3\cos^2 x + 4\cos x + 3 =$

b. $3\sin^2 x + 4\cos x - 4 = 0$

$-3\cos^2 x + 4\cos x + 3 - 4 = 0$

$3\cos^2 x - 4\cos x + 1 = 0$

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

$\cos x = \frac{1}{3}$ $\quad \cos x = 1$

for restriction given, there are <u>2</u> solutions.

⑤ a. Let $\sin\theta = w$

$3w^2 - 11w + 6$

$(3w-2)(w-3)$

$(3\sin\theta - 2)(\sin\theta - 3)$

b. $(3\sin\theta - 2)(\sin\theta - 3) = 0$

i. $\sin\theta = \frac{2}{3}, 3$

ii. 2 solutions

⑥ a. $2\cos^2 x + \sin x =$

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

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

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

b. $2\cos^2 x + \sin x = 2$

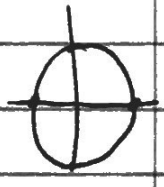
$-2\sin^2 x + \sin x + 2 = 2$

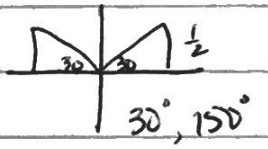
$0 = 2\sin^2 x - \sin x$

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

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

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





$x = 0, \pi, \frac{\pi}{6}, \frac{5\pi}{6}$