SOLVING DOUBLE ANGLE EQUATIONS

Note Title 12/17/2012

IE SOLVE USING EXACT VALUES.

$$2\sin(2x) + 1 = 0 \qquad 0 \le x < \pi$$

SOLN

$$2\sin(2x) \cancel{+1} = 0$$
$$\cancel{-1} \quad -1$$

$$\frac{\cancel{2}\sin(2x)}{\cancel{2}} = \frac{-1}{2}$$

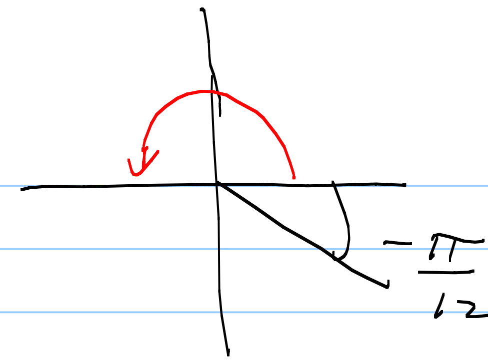
$$\sin 2x = -\frac{1}{2} \implies \sin x = -\frac{1}{2}$$

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

$$x = -\frac{\pi}{6} \div 2$$

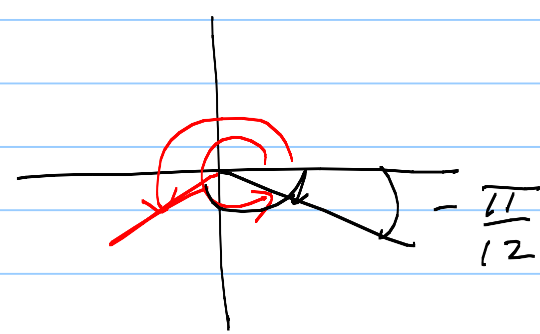
$$x = -\frac{\pi}{6} \times \frac{1}{2}$$

$$x = -\frac{\pi}{12}$$



IB $\quad 2\sin(2x) + 1 = 0 \qquad 0 \le x < 2\pi$

From above $\quad x = -\frac{\pi}{12}$



$$x_1 = 2\pi - \frac{\pi}{12}$$

$$x_1 = \frac{23\pi}{12}$$

$$x_2 = \pi + \frac{\pi}{12}$$

$$x_2 = \frac{13\pi}{12}$$

- WHAT ABOUT A GENERAL SOLUTION?

$$x_1 = \frac{23\pi}{12} + 2n\pi \qquad n \in I$$

$$x_2 = \frac{13\pi}{12} + 2n\pi \qquad n \in I$$

- IE SOLVE WITH A GENERAL SOLUTION

$$4\sin x\cos x - 1 = 0$$

<u>SOLN</u>

$$4\sin x\cos x - 1 = 0$$

$$+1 \qquad +1$$

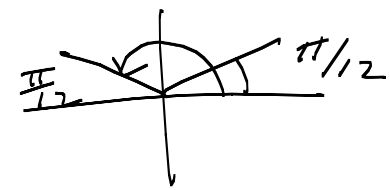
$$\frac{4\sin x\cos x}{2} = \frac{1}{2}$$

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

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

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

$$x_1 = \frac{\pi}{12} + 2n\pi \quad n \in I$$



$$x_2 = \pi - \frac{\pi}{12}$$

$$x_2 = \frac{11\pi}{12} + 2n\pi \quad n \in I$$

IE

SOLVE $\cos 2x - 3\sin x = 2 \qquad -\pi < x < \pi$

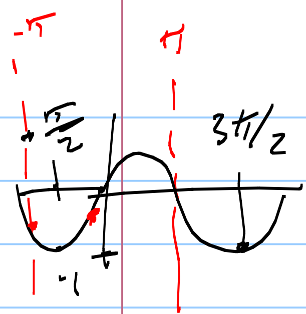
SOLN $1 - 2\sin^2 x - 3\sin x = 2$

$-2 \qquad\qquad -2$

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

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

$$2\sin^2 x + 3\sin x + 1 = 0$$



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

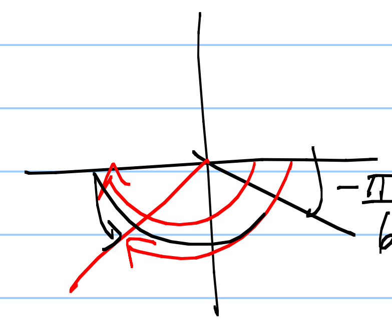
$$2\sin x(\cancel{\sin x + 1}) + 1(\cancel{\sin x + 1}) = 0$$

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

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

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

$$\boxed{x_1 = -\frac{\pi}{2}} \qquad \boxed{x_2 = -\frac{\pi}{6}}$$



$$x_3 = -\pi + \frac{\pi}{6}$$

$$\boxed{x_3 = -\frac{5\pi}{6}}$$

H/W Pg 46 SECT 6.8

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