Section 5.1 : Day 3

Solve the following equations.

$[0, 2\pi)$

Ex1: $\frac{\cos^3 x}{\sin x} = \cot x$

$\sin x \neq 0$

$\left\{ \begin{array}{l} x \neq 0 \\ x \neq \pi \end{array} \right.$ excluded.

$\frac{\cos^3 x}{\cancel{\sin x}} = \frac{\cos x}{\cancel{\sin x}}$

$\cos^3 x = \cos x$

Factor

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

$\cos x \cdot (\cos^2 x - 1) = 0$ Zero product theorem

$\cos x = 0$

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

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

$\cos^2 x - 1 = 0$

$+1 \quad +1$

$\sqrt{\cos^2 x} = \pm\sqrt{1}$

$\cos x = 1$ $\qquad \cos x = -1$

$\cancel{x = 0}$

$\cancel{x = \pi}$

Ia $\cos^2 + \sin^2 = 1$

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

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

$-\sqrt{\sin^2 x} = \sqrt{0}$

$-\sin x = 0$

$\sin x = 0$

$\cancel{x = 0}$

$\cancel{x = \pi}$

Ex 2

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

$$-1 \qquad -1$$

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

Let $\sin x = u$

$$2u^2 + u - 1 = 0$$

$$\left(u + \frac{2}{2}\right)\left(u - \frac{1}{2}\right) = 0$$

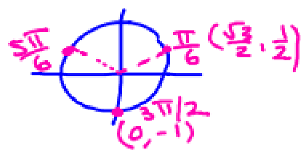
-2

$2 \quad -1$

1

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

$u = -1$ $\qquad$ $2u = 1$, $u = \frac{1}{2}$



$\sin x = -1$

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

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

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

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

Hw p 411 # 51-56.

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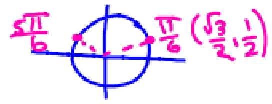
$$2\cos x \sin x - \cos x = 0$$

$$\cos x \cdot (2\sin x - 1) = 0 \qquad \text{ZPT}$$

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

$x = \frac{\pi}{2}$ $\qquad\qquad$ $+1 \quad +1$

$x = \frac{3\pi}{2}$ $\qquad\qquad$ $\frac{2\sin x}{2} = \frac{1}{2}$



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

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

- Rationalize
- $\tan = \frac{\sin}{\cos}$ (Fraction!!)
- $[0, 2\pi)$

$2\cancel{X} \cdot Y - \cancel{X}$ No

$\frac{2\cancel{X}Y}{\cancel{X}}$ Yes