p. 376) Verify:

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

$x = \frac{\pi}{12}$ $x = \frac{5\pi}{12}$

# 5-3 Notes on Solving Trigonometric Equations (continued)

Ex 1 Solve: $\sin x = -\frac{1}{2}$

$x = \frac{7\pi}{6} + 2\pi \cdot n$ $210^\circ + 360^\circ n$

$\frac{11\pi}{6} + 2\pi \cdot n$ $330^\circ + 360^\circ n$

Ex.2 Solve for $x$ in the interval $[0, 2\pi)$:

$\tan x \cos^2 x = 2\tan x$

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

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

$\tan x = 0$

$\cos^2 x - 2 = 0$

$\cos^2 x = 2$

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

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

Ex.3 Solve for $x$ in the interval $[0, 2\pi)$:

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

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

$2y^2 - y - 1 = 0$

$(2y + 1)(y - 1)$

$2\sin x + 1 = 0$

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

$\sin x - 1 = 0$

$\sin x = 1$

$x = \left\{\frac{7\pi}{6}, \frac{11\pi}{6}, \frac{\pi}{2}\right\}$

Ex.4 Solve for $x$ in the interval $[0, 2\pi)$:

$$\cos x + \sin x \tan x = 2$$

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

$\cos x + \frac{\sin x}{1}\left(\frac{\sin x}{\cos x}\right) - 2 = 0$

$\cos x \cdot \frac{\cos x}{1} + \frac{\sin^2 x}{\cos x} - 2 = 0$

$\frac{\cos^2 x + \sin^2 x}{\cos x} - 2 = 0$

$\frac{1}{\cos x} - 2 = 0$

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

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

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

Ex.5 Solve for $x$ in the interval $[0, 2\pi)$:

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

$\theta = 3x$

$\cos(3x) = \frac{1}{2}$

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

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

$3x = \frac{\pi}{3}, \frac{5\pi}{3} \rightarrow x = \frac{\pi}{9}, \frac{5\pi}{9}$

Homework
p.376
#25-45 odds