7.5 Solving Linear Trigonometric Equations

A Elementary Trigonometric Equations Use the unit circle to solve elementary trigonometric equations (see Ex 1).	**B Simple Trigonometric Equations** Use the related angle to find the solutions of simple trigonometric equations (see Ex 2).
Ex 1. Solve the following trigonometric equations. a) $\sin x = 0$ b) $\sin x = 1$ c) $\sin x = -1$ d) $\cos x = 0$ e) $\cos x = 1$ f) $\cos = -1$ g) $\tan x = 0$ h) $\tan x = 1$ i) $\tan x = -1$	Ex 2. Solve the following trigonometric equations. a) $\sin x = \frac{1}{2}$ b) $\sin x = -\frac{\sqrt{2}}{2}$ c) $\cos x = -\frac{1}{2}$ d) $\cos x = \frac{\sqrt{3}}{2}$ e) $\tan x = \sqrt{3}$ f) $\tan x = -\frac{1}{\sqrt{3}}$ g) $\sin x = \cos x$
C Factoring Some trigonometric equations can be solved by factoring.	Ex 3. Solve the following trigonometric equations. a) $\sin x \cos x = 0$ b) $\sqrt{3}\tan x + \tan^2 x = 0$

D Trigonometric Identities

Some trigonometric equations can be solved by using trigonometric identities.

Ex 4. Solve the following trigonometric equations.

a) $\sin x + \cos x = 1$

b) $\sin 2x + \sin x = 0$

E Restricted Solutions

Some trigonometric equations may have solutions restricted to specific intervals.

Ex 5. Solve the following trigonometric equations.

a) $2\sin 3x - 1 = 0, \quad 0 \le x \le 2\pi$

b) $2\sin^2 x - 1 = 0\,, \ -2\pi < x < 2\pi$

c) $4\sin x \cos x = \sqrt{3}\,, \ 0 \le x \le 2\pi$

d) $1 + \sqrt{3}\tan\dfrac{2x - \pi}{3} = 0\,, \ 0 \le x \le 2\pi$

Reading: Nelson Textbook, Pages 419-426
Homework: Nelson Textbook, Page 427: #6, 9, 10, 13, 14, 17, 18