

## 6.6 Conditional Trig Equations

**Example** Solve for all  $\theta$  in  $[0^\circ, 360^\circ)$ .

1.  $\cos \theta = 1/2$
2.  $\sin \theta = -\sqrt{3}/2$

**Example** Solve for all  $\theta$  in  $[0, 2\pi)$ .

1.  $\cos \theta = -\sqrt{2}/2$
2.  $\sin \theta = 1/2$

**Example** Solve for all real numbers  $\theta$ , where  $\theta$  is in radians.

1.  $\cos \theta = -\sqrt{3}/2$
2.  $\sin \theta = -\sqrt{2}/2$

### Solving by Linear Methods

**Example** Solve  $2 \sin \theta + 1 = 0$  over the interval  $[0, 360^\circ]$ .

### Solving by Factoring

**Example** Solve over the interval  $[0, 2\pi)$ .

$$\sin \theta \tan \theta = \sin \theta$$

### Solving Equations Using Inverse Trigonometric Functions.

**Example** Solve for all values in  $[0, 2\pi]$ .

1.  $\sin \theta = 0.70$
2.  $\cos \theta = -0.20$

**Solving by Quadratic Methods**

**Example** Solve over the interval  $[0, 2\pi)$ .

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

**Example** Use the quadratic formula to solve for  $\cot x$ . Then find all values of  $x$  that satisfy the equation.

$$\cot x(\cot x + 3) = 1$$

**Solving by Using Trigonometric Identities**

**Example** Solve over the interval  $[0, 2\pi)$ . Hint: first square both sides of the equation and then use the identity  $\tan^2 x + 1 = \sec^2 x$ .

$$\tan x + \sqrt{3} = \sec x$$

**Equations with Half-Angles**

**Example**

$$\text{Solve } 2 \sin(x/2) = 1$$

1. over the interval  $[0, 2\pi)$ .
2. give all real solutions.

**Equations with Multiple Angles**

**Example** Solve  $\cos 2x = \cos x$  over the interval  $[0, 2\pi)$ .

**Example** Solve over the interval  $[0^\circ, 360^\circ)$ .

$$4 \sin \theta \cos \theta = \sqrt{3}$$

**Example** Solve over the interval  $[0, 2\pi)$ .

$$\sin 2x = 1/2$$

**Example** Solve over the interval  $[0, 2\pi)$ .

$$\cos 2x = -\sqrt{2}/2$$

**Example** Solve over the interval  $[0, 2\pi)$ .

$$\tan 3x + \sec 3x = 2$$