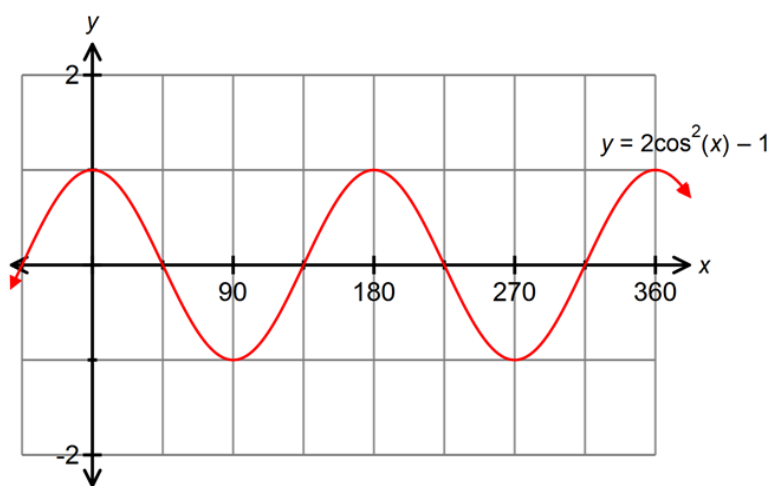


## Lesson 5.4 Solving trigonometric Equations

### Lesson 5.4: Solving Trigonometric Equations (First and Second Degree)

↳ **Graphically**  
**Algebraically**

**Example 1:** Use the graph to solve  $2\cos^2 x - 1 = 0$  where  $0^\circ \leq x < 360^\circ$



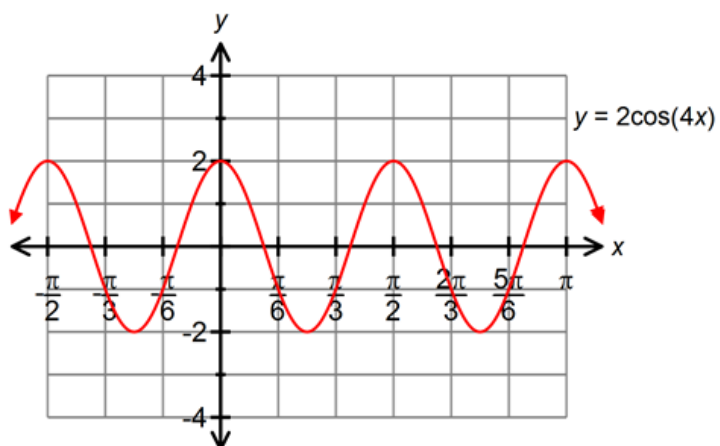
Solve  $2\cos^2 x - 1 = 0$  **algebraically** where  $0^\circ \leq x < 360^\circ$

→

## Lesson 5.4 Solving trigonometric Equations

### Graphically

Example 2: Solve  $2 \cos 4x = -1$  .



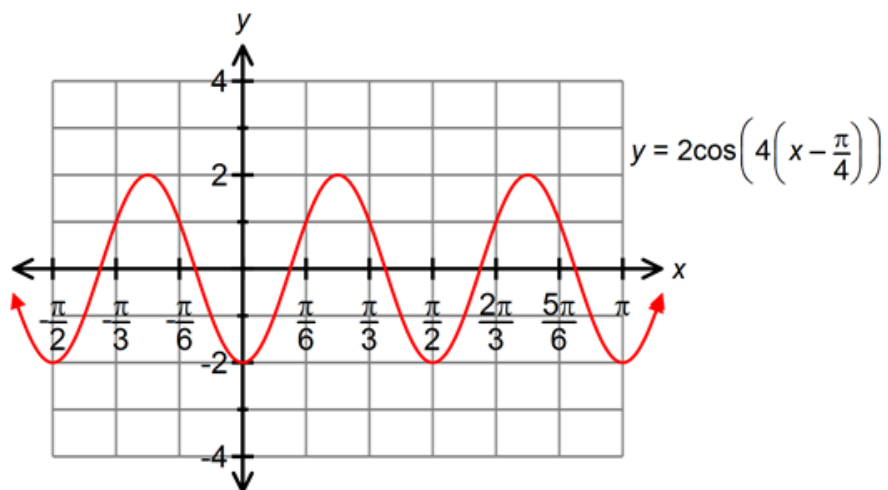
### Algebraically

→

## Lesson 5.4 Solving trigonometric Equations

### Graphically

Example 3: Solve  $2\cos 4\left(x - \frac{\pi}{4}\right) = -1$  .



### Algebraically

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***Solving Trigonometric Equations Algebraically***

**Example 4:** Determine the general solution for  $16 = 6 \cos \frac{\pi}{6} x + 14$

**Example 5:** Solve  $2 \cos 2x = \sqrt{3}$  for all values of  $x$  in degree measure



## Lesson 5.4 Solving trigonometric Equations

★ **Example 6:** Solve  $\sin(2x + 15^\circ) = \frac{1}{2}$  where  $-180^\circ \leq x \leq 180^\circ$ .

→

## Lesson 5.4 Solving trigonometric Equations

Example 7: ★

Solve  $2 \cos \left[ 4 \left( x - \frac{\pi}{2} \right) \right] + \sqrt{3} = 0$  for all values of  $x$  in radian measure

→

## Lesson 5.4 Solving trigonometric Equations

### Worksheet

Solve each of the following:

(i)  $\cos(2x + 50^\circ) = \frac{\sqrt{3}}{2}$  where  $-180^\circ \leq x \leq 180^\circ$

(ii)  $4\cos^2 x + 4\cos x + 1 = 0$  where  $0^\circ \leq x \leq 360^\circ$

(iii)  $7\cos(3x - 18) = 4$  where  $0 \leq x \leq 2\pi$

(iv)  $\sin\left(\frac{\pi}{4}(x - 6)\right) = 0.5$  where  $0 \leq x \leq 2\pi$

(v)  $8\cos(2x - 5) = 3$  general solution in radians

(vi)  $5.2\sin 45(x + 8^\circ) - 1 = -3$  general solution in degrees

(vii)  $0 = -3\sin 2x + 2$  general solution in radians

(viii)  $4\cos(x - 45^\circ) + 7 = 10$  general solution in degrees

→

## Lesson 5.4 Solving trigonometric Equations

### Example 8:

The Arctic fox is common throughout the Arctic tundra. Suppose the population  $F$ , of foxes in the region of northern Manitoba is modelled by the following function, where  $t$  is the time in months.

$$F(t) = 500 \sin \frac{\pi}{12} t + 1000$$

How many months would it take for the fox population to drop to 650?

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