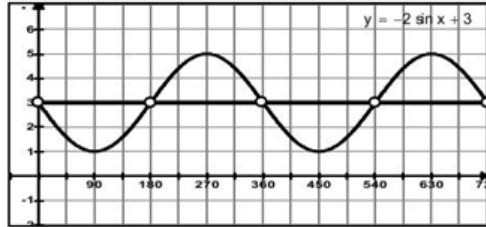


Solving Trigonometric Equations by Graphing

Workbook page 153 Q1: Solve:  $-2\sin x + 3 = 3$



Restricted Values:

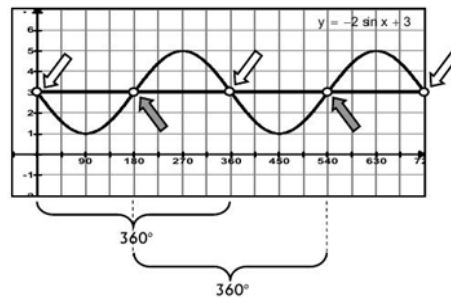
$$-360^\circ \leq \theta \leq 360^\circ$$

All Values:

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$$-2\sin x + 3 = 3$$



$$\therefore x = \begin{cases} 0^\circ + 360^\circ k, k \in \mathbb{I} \\ 180^\circ + 360^\circ k, k \in \mathbb{I} \end{cases} \left\{ \begin{array}{l} \text{These are} \\ \text{ALL possible} \\ \text{values of } x. \end{array} \right.$$

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$y = 3 \sin 2(x - 60^\circ) + 1$

Q2: Solve:  $3 \sin 2(x - 60^\circ) + 1 = 3.5$

Restricted Values:  
 $-360^\circ \leq \theta \leq 360^\circ$

All Values:

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Q3: Solve:  $2 \sin 0.5(x - 45^\circ) - 3 = -3$

Restricted Values:  
 $-360^\circ \leq \theta \leq 360^\circ$

All Values:

Solve:  $2 \sin 0.5(x - 45^\circ) - 3 = -3$

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Q4: Solve:  $4 \cos 3(x - 90^\circ) - 2 = -2$

Restricted Values:  
 $-360^\circ \leq \theta \leq 360^\circ$

All Values:

Q5: Solve:  $4 \cos 3(x - 90^\circ) - 2 = -6$

Restricted Values:  
 $-360^\circ \leq \theta \leq 360^\circ$

All Values:

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**EXAMPLE 13**  
 Determine all possible values of  $x$  that satisfy the trigonometric equation  $\sin x = \frac{1}{2}$ .

**Solution**  
 Draw the line  $y = \frac{1}{2}$  on the same axes, and identify the "different" points of intersection.

The period of the sinusoidal function is  $360^\circ$ .

$\therefore x = \begin{cases} 30^\circ + 360^\circ k, & k \in \mathbb{I} \\ 150^\circ + 360^\circ k, & k \in \mathbb{I} \end{cases}$

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**EXAMPLE 14**  
Determine all possible values of  $x$  that satisfy the trigonometric equation  $3\cos 2x + 2 = 3.5$ .

**Solution**  
Draw the line  $y = 3.5$  on the same axes, and identify the "different" points of intersection.

The period of the sinusoidal function is  $180^\circ$ .

$\therefore x = \begin{cases} 30^\circ + 180^\circ k, & k \in \mathbb{I} \\ 150^\circ + 180^\circ k, & k \in \mathbb{I} \end{cases}$

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a.  $\cos x + 4 = 3$

**SOLUTION:** \_\_\_\_\_

Restricted Values:  
 $-360^\circ \leq \theta \leq 360^\circ$

All Values:

b.  $\sin \frac{1}{2}x + 2 = \frac{3}{2}$

**SOLUTION:** \_\_\_\_\_

Restricted Values:  
 $-360^\circ \leq \theta \leq 360^\circ$

All Values:

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Feb 1-8:56 AM

c.  $-\sin 2x + 1 = 0$

$y = -\sin 2x + 1$

SOLUTION: \_\_\_\_\_

←—————→

**Restricted Values:**  
 $-360^\circ \leq \theta \leq 360^\circ$

**All Values:**

Feb 1-8:57 AM

d.  $4 \cos x - 3 = -5$

$y = 4 \cos x - 3$

SOLUTION: \_\_\_\_\_

←—————→

**Restricted Values:**  
 $-360^\circ \leq \theta \leq 360^\circ$

**All Values:**

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e.  $2 \cos 2x + 3 = 4$

$y = 2 \cos 2x + 3$

SOLUTION: \_\_\_\_\_

←—————→

**Restricted Values:**  
 $-360^\circ \leq \theta \leq 360^\circ$

**All Values:**

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f.  $3 \sin \frac{1}{2} x - 3.2 = -2$

$y = 3 \sin \frac{1}{2} x - 3.2$

SOLUTION: \_\_\_\_\_

←—————→

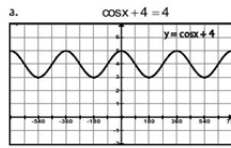
**Restricted Values:**  
 $-360^\circ \leq \theta \leq 360^\circ$

**All Values:**

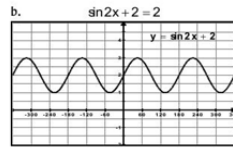
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39. Determine all possible values of x that satisfy each trigonometric equation.



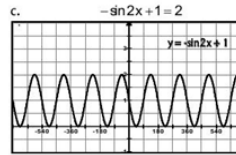
$x = \{$



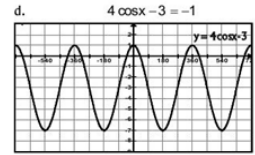
$x = \{$



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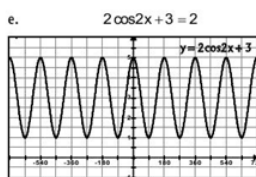
$x = \{$



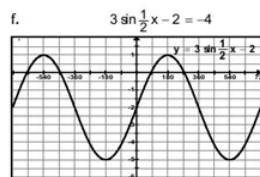
$x = \{$



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$x = \{$



$x = \{$



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