

# Absolute Value Equations

8.24.16, 8.25.16

L3

Springboard 1.3

Warm-up

Solve for x

1)  $2x + 7 = 19$

2)  $8 + 2x = 12$

3)  $2(x + 4) = 10$

The **absolute value** represents the distance the value is from 0. It is always a positive number.

Examples:

$$|5| = 5$$

$$|-2| = 2$$

I do:

*Solve*  $|x - 2| = 5$ .

Split into two equations	$x - 2 = 5$	$x - 2 = -5$
Solve for x	$x = 7$	$x = -3$
Graph them		

We do:

*Solve*  $|x - 5| = 3$ .

Split into two equations		
Solve for x		
Graph them		

You do with your partners on your notebooks:

*Solve*  $|-x + 7| = -3$ .

Split into two equations		
Solve for x		
Graph them		

I try:

*Solve*  $2|x - 5| - 3 = 3$ .

Isolate the absolute value	$2 x - 5  - 3 = 3$ $2 x - 5  = 6$ $ x - 5  = 3$	
Split into two equations	$x - 5 = 3$	$x - 5 = -3$
Solve for x	$x = 8$	$x = 2$
Graph them		

We do:

$$\text{Solve } 3|2x + 2| = 9.$$

Split into two equations		
Solve for x		
Graph them		
Graph the solutions		

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$$\text{Solve } 3|2x + 2| = 9.$$

Split into two equations		
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You Try with your partner in your notebooks

$$\text{Solve } 2|2x + 4| = 6.$$

Isolate the absolute value		
Split into two equations		
Solve for x		

You Try with your partner in your notebooks

$$\text{Solve } 3|2x + 4| - 5 = 10.$$

Isolate the absolute value		
Split into two equations		
Solve for x		

Graph the solution		
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I do:

*Solve*  $|x - 2| > 5$ .

Split into two equations	$x - 2 > 5$	$x - 2 < -5$
Solve for x	$x > 7$	$x < -3$
Graph them		

We do:

*Solve*  $3|-2x + 2| - 6 < 9$ .

Isolate the absolute value	
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Split into two equations		
Solve for x		
Graph the solution		

We do:

$$\text{Solve } 3|-2x + 2| - 6 \geq 9.$$

Isolate the absolute value		
Split into two equations		
Solve for x		



Graph the solution		
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You Try with your partner in your notebooks

*Solve*  $3|x - 2| \leq 12$ .

Isolate the absolute value		
Split into two equations		
Solve for x		
Graph the solution		

You Try with your partner in your notebooks

*Solve*  $|-2x + 9| + 2 > 20$ .

Isolate the absolute value		
Split into two equations		
Solve for x		
Graph the solution		

Jason is a dentist. His job is to prepare teeth for a beautiful smile. On average, a smile will reveal about 2mm of teeth. However, it is acceptable to have the amount of teeth showing within 1mm. Write an equation for how much teeth shows in a smile.

Jason's furnace normally operates at  $400^{\circ}\text{C}$ . The temperature must be within  $30^{\circ}\text{C}$ . Write an equation for what temperatures the furnace must be within.