

Section 1-6
Absolute Value Equations

Students will be able to write and solve equations and inequalities involving absolute value.

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Define:

Absolute Value Distance from 0

- Always positive
Output

How many solutions does an absolute value equation have? Explain.

2 $|x|=4$ x could be 4 or -4

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Solve and graph:

$$|3x + 2| = 4$$

Case 1

$$3x + 2 = 4$$

$$3x = 2$$

$$x = \frac{2}{3}$$

check

Case 2

$$3x + 2 = -4$$

$$3x = -6$$

$$x = -2$$

check

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Solve and graph

$$\frac{2|x + 9| + 8}{2} = 7 \quad \text{isolate the abs value 1st}$$

$$|x + 9| = 2$$

C1

$$x + 9 = 2$$

$$x = -7$$

check 2

$$x + 9 = -2$$

$$x = -11$$

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What is the solution to $|x| = -10$?

~~0~~
Abs. Value cannot be negative

This is called an extraneous solution.

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Solve and check for extraneous solutions:

$$|5x - 2| = 7x + 14$$

C1

$$5x - 2 = 7x + 14$$

$$-16 = 2x$$

$$-8 = x$$

Check doesn't work

C2

$$5x - 2 = -7x - 14$$

$$12x = -12$$

$$x = -1$$

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