

Objective: To write, solve, and graph absolute value equations and inequalities in one variable.
Essential Question: How are absolute value equations different on a number line than absolute value inequalities?

IN:

- Using your calculator, find the solution BY GRAPHING:

$$2x + 3 = 4$$

- Because this can be done a multiple of ways, check with your partner to see if he/she has solved it differently.

- Verify algebraically



Aug 25-10:04 AM

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How are absolute value equations different?

- Using your calculator, find the solution BY GRAPHING:

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

- What makes this problem different than the warm-up?

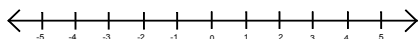
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Definition of Absolute value:

Geometric definition:

Let x be any real number. The absolute value of x is the distance from x to 0 on the number line. $|x| = 4$



Algebraic definition:

Let x be any real number. The absolute value of x is given by:

$$\text{If } x \geq 0, \text{ then } |x| = x.$$

$$\text{If } x < 0, \text{ then } |x| = -x.$$

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Solving an Absolute Value Equation:

Earlier, you solved the following equation by graphing: $|2x + 3| = 4$

What were the two solutions? $x = \underline{\hspace{2cm}}$ and $x = \underline{\hspace{2cm}}$

- Solve this algebraically.
- How many solutions did you get?
- How can we get to the two solutions from the graph?

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Solving an Absolute Value Equation:

Solve: $|5x - 3x + 8| = -2$

- Graphically
- Algebraically

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Solving an Absolute Value Equation:

Solve: $|x - 3| = 3x + 5$

- Graphically
- Algebraically

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Create an Absolute Value Equation

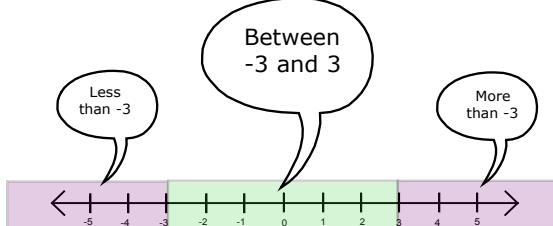
- Write your own absolute value equation.
- Switch with a partner and solve.

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Absolute value Inequalities



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Absolute Value Inequalities

- Solve and graph on a number line: $|5 - 3x| > 9$

Test points to decide arrows.

- Solve and graph on a number line: $|5 - 3x| \leq 9$

Test points to decide arrows.

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Absolute Value Inequalities APPLICATION

A gear is designed with a specification of 3.50 centimeters for the diameter. It will work if it is no more than ± 0.01 cm of the specified measurement.

WRITE an absolute value inequality to represent the measurement tolerance for the diameter of this gear.

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OUT:

Solve and graph on a number line

$$-2x + 4 \leq 10$$

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Homework:

Page 68 - 69:
25 - 57 odd,
63 and 65

SUMMARY:

Compare and contrast graphing linear inequalities and linear absolute value inequalities.
(Use the OUTS from today and Lesson 1.7)

Aug 25-3:04 PM
