

6.5: Solve Absolute Value Equations

- Goals:**
- *Solve a simple absolute value equation
 - *Solve a multi-step absolute value equations
 - *Decide if absolute value equations have no solutions
 - *Use absolute deviation to set up and solve real world problems
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ABSOLUTE VALUE:**ABSOLUTE VALUE EQUATION:**

Solve a simple absolute value equation:

Ex: $|x| = 7$ **(Hint: What are the possible values of x that would have an absolute value of 7?)**

Ex: $|x| = 3$

Ex: $|x| = 15$

Ex: $|x| = 9$

Solve a multi-step absolute value equation:

Ex: Solve $|x - 3| = 8$

1. Rewrite the absolute value equations as two separate equations, one equal to the positive answer and one equal to the negative answer.
2. Solve each equation separately.

Ex: Solve $|x + 4| = 3$

Ex: Solve $|x - 7| = 9$

Solve an absolute value equation by rewriting it.

- **To solve an absolute value equation it first needs to be in the form $|ax + b| = c$**
- **Hint: Isolate the *argument*, which lives inside the absolute value bars.**
- **Then create two separate equations once it is in the correct form.**

Ex: Solve $3|2x - 7| - 5 = 4$

Solve each absolute value equation:

Ex: $2|x| + 4 = 18$

Ex: $4|x + 9| - 5 = 19$

Ex: $3|4x + 2| - 7 = 11$

Decide if an equation has no solutions.

Ex: $|3x + 5| + 6 = -2$

Ex: $3|2x - 8| + 3 = 2$

Solve the following absolute value equations:

Ex: $2|x - 5| + 4 = 2$

Ex: $-3|n + 2| - 7 = -10$

ABSOLUTE DEVIATION:

Ex: The absolute deviation of x from 7.6 is 5.2. What are the values of x that satisfy this requirement?

Ex: A volleyball league is preparing a two minute radio ad to announce tryouts. The ad has an absolute deviation of 3 seconds. Find the minimum and maximum acceptable time the ad can run.

Ex: Before the start of a professional basketball game, a basketball must be inflated to an air pressure of 8 pounds per square inch (psi) with an absolute error of 0.5 (psi). (*Absolute error* is the margin for error in either direction, above or below, the accepted value) Find the minimum and maximum acceptable air pressures for the basketball by setting up and solving an absolute value equation.