

1.7 Solving Absolute Value Equations and Inequalities

- absolute value** - the distance a number is from 0
- always positive because distance is positive

An absolute value equation is in the form $|ax + b| = c$.

To solve an absolute value equation when $c \geq 0$:

$$ax + b = c \quad \text{or} \quad ax + b = -c$$

If $c < 0$, there is no solution.

Solve each absolute-value equation.

1. $|x - 2| = 5$ *dist. from zero is 5*

$$\begin{array}{l} x - 2 = -5 \text{ or } x - 2 = 5 \\ +2 \quad +2 \quad +2 \quad +2 \\ \hline x = -3 \quad x = 7 \end{array}$$

2. $|x + 3| = -8$ *dist. from zero is -8*

no solution

ISOLATE ABSOLUTE VALUE!

3. $|2x - 1| + 3 = 17$ 4. $\frac{1}{2}|x + 5| - 6 = -3$

-3 -3 $+6$ $+6$

$|2x - 1| = 14$ $|x + 5| = 6$ dist is 6

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$2x - 1 = -14$ or $2x - 1 = 14$

$+1$ $+1$ $+1$ $+1$

$\frac{2x}{2} = \frac{-13}{2}$ $\frac{2x}{2} = \frac{15}{2}$

$x = -6.5$ or $x = 7.5$

$2 \cdot \frac{1}{2} |x + 5| = 3 \cdot 2$

$|x + 5| = 6$ dist is 6

$x + 5 = -6$ or $x + 5 = 6$

-5 -5 -5 -5

$x = -11$ or $x = 1$

① $|x - 8| = 4$

② $|6x + 15| = 3$

③ $|x - 5| + 9 = 16$

④ $|x + 3| - 12 = 20$

⑤ $2|x + 6| - 8 = 24$

DO FOR HOMEWORK