

6-5 Solving Open Sentences Involving Absolute Value (Pages 345–351)

An open sentence involving absolute value can be solved by first rewriting it as a compound sentence.

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| Rewriting Absolute Value Equations and Inequalities | <ul style="list-style-type: none"> If $x = n$, then $x = -n$ or $x = n$. If $x < n$, then $x > -n$ and $x < n$. (Also true for $x \leq n$) If $x > n$, then $x < -n$ or $x > n$. (Also true for $x \geq n$) |
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Examples Solve each open sentence. Then graph the solution set.

a. $|2 + 4y| < 6$

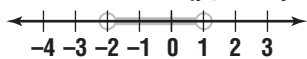
Rewrite as a compound inequality. Then solve.

$$2 + 4y > -6 \text{ and } 2 + 4y < 6$$

$$4y > -8 \qquad 4y < 4$$

$$y > -2 \qquad y < 1$$

The solution set is $\{y | -2 < y < 1\}$.

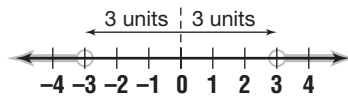


b. $|p| > 3$

Rewrite as a compound inequality. Then solve.

$$p < -3 \text{ or } p > 3$$

The solution set is $\{p | p < -3 \text{ or } p > 3\}$.



Try These Together

1. Solve $|a - 4| = 7$ and graph the solution set.

HINT: The solution will be two points.

2. Solve $|6s - 4| < 8$ and graph the solution set.

HINT: The solution will be a line segment.

Practice

Solve each open sentence. Then graph the solution set.

3. $|5d + 1| = 9$

4. $|2 - 2y| > 8$

5. $|3 - n| \leq 4$

6. $|-w + 8| \geq 11$

7. $|2g - 6| < 1$

8. $|1.1z - 3.3| = 7.7$

Express each statement in terms of an inequality involving absolute value.

9. The weight w in a bicycle trailer is allowed to vary from 60 pounds by no more than 40 pounds.

10. The height h of a person allowed on a roller coaster can vary from 65 inches by no more than 13 inches.

11. **Standardized Test Practice** Solve $|x - 5| \leq 7$.

A $\{x | x \leq 12 \text{ or } x \geq -2\}$

B $\{x | -2 \leq x \leq 12\}$

C $\{x | x \leq 12\}$

D $\{x | x \geq -2\}$

Answers: 1–8. For graphs, see Answer Key. 1. $\{-3, 11\}$ 2. $\{s | -\frac{3}{2} < s < 2\}$ 3. $\{-2, \frac{5}{8}\}$ 4. $\{y | y < -3 \text{ or } y > 5\}$ 5. $\{n | -1 \leq n \leq 7\}$ 6. $\{w | w \leq -3 \text{ or } w \geq 19\}$ 7. $\{g | 2.5 < g < 3.5\}$ 8. $\{-4, 10\}$ 9. $|-60| \leq 40$ 10. $|h - 65| \leq 13$ 11. B