

Study Guide and Intervention

Alg1 3.0

Solving Open Sentences Involving Absolute Value

Absolute Value Equations When solving equations that involve absolute value, there are two cases to consider.

Case 1: The value inside the absolute value symbols is positive.

Case 2: The value inside the absolute value symbols is negative.

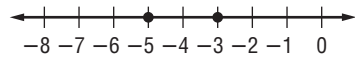
Example 1 Solve $|x + 4| = 1$. Then graph the solution set.

Write $|x + 4| = 1$ as $x + 4 = 1$ or $x + 4 = -1$.

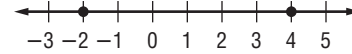
$$\begin{array}{l} x + 4 = 1 \quad \text{or} \quad x + 4 = -1 \\ x + 4 - 4 = 1 - 4 \quad \quad \quad x + 4 = -1 \\ x = -3 \quad \quad \quad x + 4 - 4 = -1 - 4 \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad x = -5 \end{array}$$

The solution set is $\{-5, -3\}$.

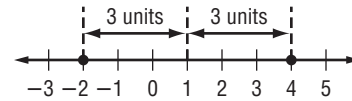
The graph is shown below.



Example 2 Write an equation involving absolute value for the graph.



Find the point that is the same distance from -2 as it is from 4 .



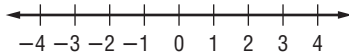
The distance from 1 to -2 is 3 units. The distance from 1 to 4 is 3 units.

So, $|x - 1| = 3$.

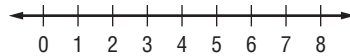
Exercises

Solve each open sentence. Then graph the solution set.

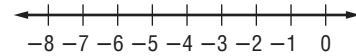
1. $|y| = 3$



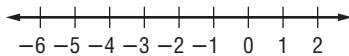
2. $|x - 4| = 4$



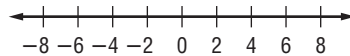
3. $|y + 3| = 2$



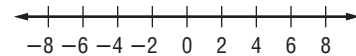
4. $|b + 2| = 3$



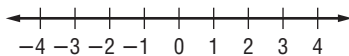
5. $|w - 2| = 5$



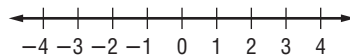
6. $|t + 2| = 4$



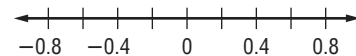
7. $|2x| = 8$



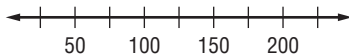
8. $|5y - 2| = 7$



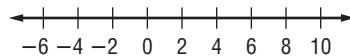
9. $|p - 0.2| = 0.5$



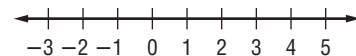
10. $|d - 100| = 50$



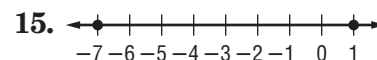
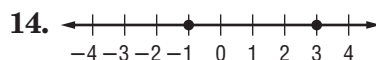
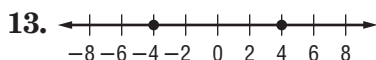
11. $|2x - 1| = 11$



12. $\left|3x + \frac{1}{2}\right| = 6$



For each graph, write an open sentence involving absolute value.



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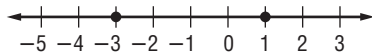
Example 1 Solve $|x + 1| = 2$. Then graph the solution set.

Write $|x + 1| = 2$ as $x + 1 = 2$ and $x + 1 = -2$.

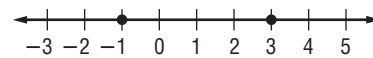
$$\begin{array}{l} x + 1 = 2 \quad \text{or} \quad x + 1 = -2 \\ x + 1 - 1 = 2 - 1 \quad \quad x + 1 - 1 = -2 - 1 \\ x = 1 \quad \quad \quad \quad \quad x = -3 \end{array}$$

The solution set is $\{-3, 1\}$.

The graph is shown below.



Example 2 Write an equation involving absolute value for the graph.



Find the point that is the same distance from -1 as it is from 3 .

The distance from 1 to -1 is 2 units.

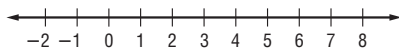
The distance from 1 to 3 is 2 units.

So, $|x - 1| = 2$

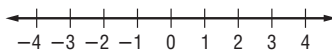
Exercises

Solve each open sentence. Then graph the solutions set.

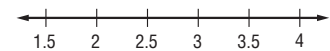
1. $|w - 3| = 4$



2. $|2k - 3| = 1$



3. $|x - 3.2| = 0.8$



For each graph, write an open sentence involving absolute value.

