

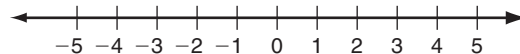
LESSON
2-8

Practice A

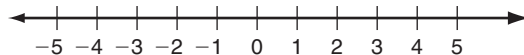
Solving Absolute-Value Equations and Inequalities

Solve each compound inequality. Then graph the solution.

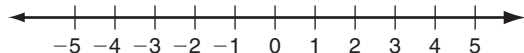
1. $2x < 8$ and $x + 3 > 3$



2. $x - 13 \geq -15$ or $4x < -12$



3. $4x \geq -16$ and $x + 1 \leq 0$



Solve each equation.

4. $|3x| = 36$

$3x = \underline{\hspace{2cm}}$ or $3x = \underline{\hspace{2cm}}$

$x = \underline{\hspace{2cm}}$ or $x = \underline{\hspace{2cm}}$

5. $|x| - 7 = -1$

6. $|8x| - 13 = 11$

Determine whether each inequality is a conjunction or a disjunction and whether you would use *and* or *or*.

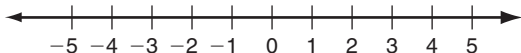
7. $|4x| + 10 > 30$

8. $|5x + 11| < 21$

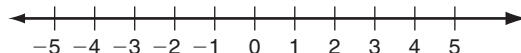
9. $3|x - 1| \geq 6$

Solve each inequality. Then graph the solution.

10. $\frac{|3x - 1|}{2} \leq 3$



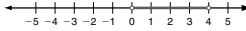
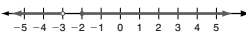
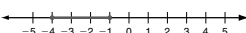
11. $5|2x| > 10$



12. Phil told his friend that if you subtract 12 from his age and then take the absolute value, you'll get an answer of 3. How old is Phil?

LESSON Practice A
2-3 Solving Absolute-Value Equations and Inequalities

Solve each compound inequality. Then graph the solution.

- $2x < 8$ and $x + 3 > 3$
 $x < 4$ and $x > 0$

- $x - 13 \geq -15$ or $4x < -12$
 $x \geq -2$ or $x < -3$

- $4x \geq -16$ and $x + 1 \leq 0$
 $x \geq -4$ and $x \leq -1$


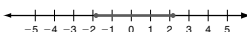
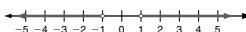
Solve each equation.

- $|3x| = 36$
 $3x = 36$ or $3x = -36$
 $x = 12$ or $x = -12$
- $|x - 7| = -1$
 $x = 6$ or $x = -6$
- $|8x| - 13 = 11$
 $x = 3$ or $x = -3$

Determine whether each inequality is a conjunction or a disjunction and whether you would use *and* or *or*.

- $|4x| + 10 > 30$ Disjunction, or
- $|5x + 11| < 21$ Conjunction, and
- $3|x - 1| \geq 6$ Disjunction, or

Solve each inequality. Then graph the solution.

- $\frac{|3x - 1|}{2} \leq 3$
 $-\frac{5}{3} \leq x \leq \frac{7}{3}$

- $5|2x| > 10$
 $x < -1$ or $x > 1$


12. Phil told his friend that if you subtract 12 from his age and then take the absolute value, you'll get an answer of 3. How old is Phil?

9 or 15

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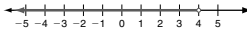
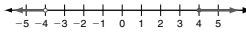
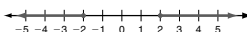
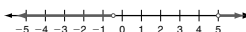
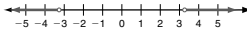
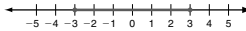
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LESSON Practice B
2-3 Solving Absolute-Value Equations and Inequalities

Solve each equation.

- $|2x + 1| = 7$
 $x = 3$ or $x = -4$
- $|-7x| = 28$
 $x = \pm 4$
- $3|3x| - 7 = 2$
 $x = \pm 1$
- $|2x - 5| = 5$
 $x = 6$ or $x = -8$
- $2|x + 1| = 14$
 $x = -3$ or $x = 11$
- $|4 - x| + 2 = 9$

Solve each inequality or compound inequality. Then graph the solution.

- $-4x + 2 > -10$ and $5x - 12 < 8$
 $x < 4$

- $3x - 4 \geq 8$ or $-x + 12 > 16$
 $x \geq 4$ or $x < -4$

- $|9x| \geq 18$
 $x \leq -2$ or $x \geq 2$

- $|3x - 7| > 8$
 $x < -\frac{1}{3}$ or $x > 5$

- $|0.3x| > 1$
 $x < -\frac{10}{3}$ or $x > \frac{10}{3}$

- $|7x| - 12 \leq 9$
 $x \geq -3$ and $x \leq 3$


Solve.

13. Any measurement is accurate within ± 0.5 of the measurement unit. For example, if you measure your pencil to the nearest inch, your measurement could be 0.5 inch too long or 0.5 inch too short. Write an absolute-value inequality that shows the maximum and minimum actual measure of a nail measured to be 4.4 centimeters to the nearest 0.1 centimeter.

$$|m - 4.4| \leq 0.05$$

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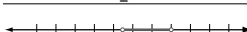

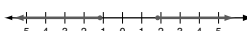
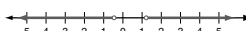
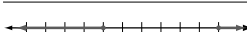
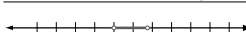
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LESSON Practice C
2-3 Solving Absolute-Value Equations and Inequalities

Solve each equation.

- $|2x - 3| = 15$
 $x = -6$ or $x = 9$
- $\frac{1}{2}|x + 9| = 1$
 $x = -11$ or $x = -7$
- $11 - |4 - x| = 4$
 $x = -3$ or $x = 11$

Solve and graph.

- $5(7 - 2x) < 40$ and $5x + 2 < 12$
 $-\frac{1}{2} < x < 2$

- $\frac{7x - 10}{6} \leq 3$ or $3x + 2 > 5x - 8$
 $x < 5$

- $|\frac{4x - 1}{6}| \geq 1$
 $x \leq -\frac{5}{4}$ or $x \geq \frac{7}{4}$

- $-3|5x - 2| < -12$
 $x < -\frac{2}{5}$ or $x > \frac{6}{5}$

- $|3x - 6| + 6 \geq 24$
 $x \leq -1$ or $x \geq 5$

- $\frac{|9x + 1|}{4} < 2$
 $x > -1$ and $x < \frac{7}{9}$


Solve.

10. Ben says that there is no solution for this absolute-value inequality. Is he correct? If not, solve the inequality. Explain how you know you are correct.

$$32 + \frac{|x - 7|}{13} < 7$$

Possible answer: Ben is correct. There is no solution. When the inequality is simplified, the result is an inequality that sets the absolute value of an expression less than a negative number. Since absolute values are always positive, this is never true.

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LESSON Reteach
2-3 Solving Absolute-Value Equations and Inequalities

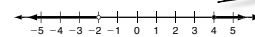
To solve compound inequalities, solve both inequalities. Then graph.

Solve $x + 6 < 4$ or $2x \geq 8$.

$$x + 6 < 4 \quad \text{OR} \quad 2x \geq 8$$

$$x < -2 \quad \text{OR} \quad x \geq 4$$

This inequality uses OR. Its graph has two parts.

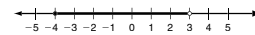


Solve $x - 2 < 1$ and $-3x \leq 12$.

$$x - 2 < 1 \quad \text{AND} \quad -3x \leq 12$$

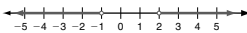
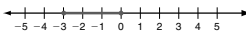
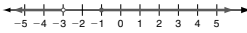
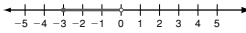
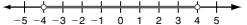
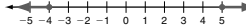
$$x < 3 \quad \text{AND} \quad x \geq -4$$

Reverse the inequality when dividing by a negative number.



This inequality uses AND. Its graph has one part.

Solve and graph each compound inequality.

- $x + 3 < 2$ or $\frac{1}{2}x > 1$
 $x < -1$ OR $x > 2$

- $-6x \leq 18$ and $x + 6 \leq 6$
 $x \geq -3$ AND $x \leq 0$

- $x - 4 < -7$ or $-4x \leq 4$
 $x < -3$ OR $x \geq -1$

- $-3x \leq 6$ and $x + 2 < 5$
 $x \geq -2$ AND $x < 3$

- $3x < 12$ and $-3x < 12$
 $x < 4$ and $x > -4$

- $\frac{1}{2}x - 2 \leq 0$ or $2 - \frac{1}{2}x \leq -1$
 $x \leq 4$ or $x \geq 5$


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