

Absolute Value Equations and Inequalities Assignment

Solve each equation.

1. $|x - 5| = 9$

2. $|2x - 1| = 23$

3. $|x + 6| + 3 = 16$

4. $|x + 4| = 7$

5. $|6x - 3| = 27$

6. $|2x + 5| + 8 = 23$

Solve each inequality.

7. $|x + 3| < 18$

8. $|x - 4| \leq 18$

9. $|2x + 7| > 5$

10. $|2x + 3| \geq 13$

11. $|5x + 2| - 9 \geq 18$

12. $|3x + 7| - 3 < 8$

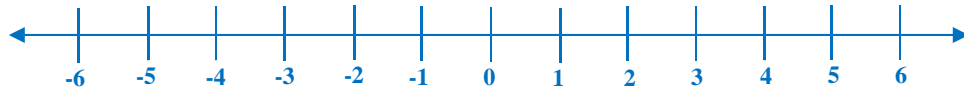
Solve each inequality then graph its solution.

13. $|x + 4| < 9$



Absolute Value Equations and Inequalities Assignment

14. $|3x - 1| - 2 \leq 12$



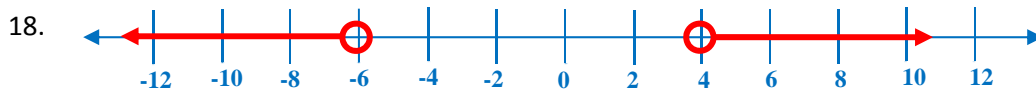
15. $|2x - 2.6| > 4$



16. $|4 + x| + 8 < 11$



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



19. Ms. Smith' geometry class has a final grades range of 70 to 100. Write an absolute value inequality describing the range of the final grades.

20. Ultraviolet light has a frequency range of 0.8 PHz to 30 PHz Write an absolute value inequality describing the frequency range of ultraviolet light.

Absolute Value Equations and Inequalities Assignment

Solve each equation.

1. $|x - 5| = 9$

$x - 5 = 9$

$x - 5 + 5 = 9 + 5$

$x = 14$

$x - 5 = -9$

$x - 5 + 5 = -9 + 5$

$x = -4$

2. $|2x - 1| = 23$

$2x - 1 = 23$

$2x - 1 + 1 = 23 + 1$

$2x = 24$

$\frac{2x}{2} = \frac{24}{2}$

$x = 12$

$2x - 1 = -23$

$2x - 1 + 1 = -23 + 1$

$2x = -22$

$\frac{2x}{2} = \frac{-22}{2}$

$x = -11$

3. $|x + 6| + 3 = 16$

$|x + 6| + 3 - 3 = 16 - 3$

$|x + 6| = 13$

$x + 6 = 13$

$x + 6 - 6 = 13 - 6$

$x = 7$

$x + 6 = -13$

$x + 6 - 6 = -13 - 6$

$x = -19$

4. $|x + 4| = 7$

$x + 4 = 7$

$x + 4 - 4 = 7 - 4$

$x = 3$

$x + 4 = -7$

$x + 4 - 4 = -7 - 4$

$x = -11$

5. $|6x - 3| = 27$

$6x - 3 = 27$

$6x - 3 + 3 = 27 + 3$

$6x = 30$

$\frac{6x}{6} = \frac{30}{6}$

$x = 5$

$6x - 3 = -27$

$6x - 3 + 3 = -27 + 3$

$6x = -24$

$\frac{6x}{6} = \frac{-24}{6}$

$x = -4$

6. $|2x + 5| + 8 = 23$

$|2x + 5| + 8 - 8 = 23 - 8$

$|2x + 5| = 15$

$2x + 5 = 15$

$2x + 5 - 5 = 15 - 5$

$2x = 10$

$\frac{2x}{2} = \frac{10}{2}$

$x = 5$

$2x + 5 = -15$

$2x + 5 - 5 = -15 - 5$

$2x = -20$

$\frac{2x}{2} = \frac{-20}{2}$

$x = -10$

Absolute Value Equations and Inequalities Assignment

Solve each inequality.

7. $|x + 3| < 18$ $-21 < x < 15$
 $x + 3 < 18$ $x + 3 > -18$
 $x + 3 - 3 < 18 - 3$ $x + 3 - 3 > -18 - 3$
 $x < 15$ $x > -21$

8. $|x - 4| \leq 18$ $-14 \leq x \leq 22$
 $x - 4 \leq 18$ $x - 4 \geq -18$
 $x - 4 + 4 \leq 18 + 4$ $x - 4 + 4 \geq -18 + 4$
 $x \leq 22$ $x \geq -14$

9. $|2x + 7| > 5$ $x > -1$ or $x < -6$
 $2x + 7 > 5$ $2x + 7 < -5$
 $2x + 7 - 7 > 5 - 7$ $2x + 7 - 7 < -5 - 7$
 $2x > -2$ $2x < -12$
 $\frac{2x}{2} > \frac{-2}{2}$ $\frac{2x}{2} < \frac{-12}{2}$
 $x > -1$ $x < -6$

10. $|2x + 3| \geq 13$ $x \geq 5$ or $x \leq -8$
 $2x + 3 \geq 13$ $2x + 3 \leq -13$
 $2x + 3 - 3 \geq 13 - 3$ $2x + 3 - 3 \leq -13 - 3$
 $2x \geq 10$ $2x \leq -16$
 $\frac{2x}{2} \geq \frac{10}{2}$ $\frac{2x}{2} \leq \frac{-16}{2}$
 $x \geq 5$ $x \leq -8$

11. $|5x + 2| - 9 \geq 18$ $x \geq 5$ or $x \leq -\frac{29}{5}$
 $|5x + 2| - 9 + 9 \geq 18 + 9$
 $|5x + 2| \geq 27$
 $5x + 2 \geq 27$ $5x + 2 \leq -27$
 $5x + 2 - 2 \geq 27 - 2$ $5x + 2 - 2 \leq -27 - 2$
 $5x \geq 25$ $5x \leq -29$
 $\frac{5x}{5} \geq \frac{25}{5}$ $\frac{5x}{5} \leq \frac{-29}{5}$
 $x \geq 5$ $x \leq -\frac{29}{5}$

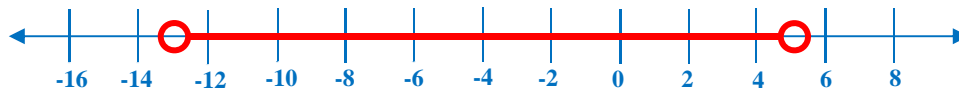
12. $|3x + 7| - 3 < 8$ $-6 < x < \frac{4}{3}$
 $|3x + 7| - 3 + 3 < 8 + 3$
 $|3x + 7| < 11$
 $3x + 7 < 11$ $3x + 7 > -11$
 $3x + 7 - 7 < 11 - 7$ $3x + 7 - 7 > -11 - 7$
 $3x < 4$ $3x > -18$
 $\frac{3x}{3} < \frac{4}{3}$ $\frac{3x}{3} > \frac{-18}{3}$
 $x < \frac{4}{3}$ $x > -6$

Absolute Value Equations and Inequalities Assignment

Solve each inequality then graph its solution.

13. $|x + 4| < 9$

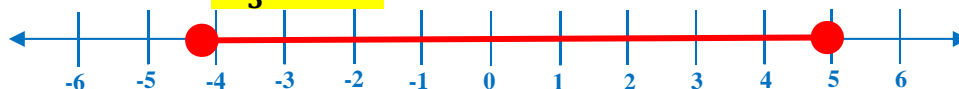
$-13 < x < 5$



$$\begin{array}{l} x + 4 < 9 \\ x + 4 - 4 < 9 - 4 \\ x < 5 \end{array} \qquad \begin{array}{l} x + 4 > -9 \\ x + 4 - 4 > -9 - 4 \\ x > -13 \end{array}$$

14. $|3x - 1| - 2 \leq 12$

$-\frac{13}{3} \leq x \leq 5$



$$\begin{array}{l} |3x - 1| - 2 + 2 \leq 12 + 2 \\ |3x - 1| \leq 14 \\ 3x - 1 \leq 14 \\ 3x - 1 + 1 \leq 14 + 1 \\ 3x \leq 15 \\ \frac{3x}{3} \leq \frac{15}{3} \\ x \leq 5 \end{array} \qquad \begin{array}{l} 3x - 1 \geq -14 \\ 3x - 1 + 1 \geq -14 + 1 \\ 3x \geq -13 \\ \frac{3x}{3} \geq \frac{-13}{3} \\ x \geq -\frac{13}{3} \end{array}$$

15. $|2x - 2.6| > 4$

$x > 3.3 \text{ or } x < -0.7$



$$\begin{array}{l} 2x - 2.6 > 4 \\ 2x - 2.6 + 2.6 > 4 + 2.6 \\ 2x > 6.6 \\ \frac{2x}{2} > \frac{6.6}{2} \\ x > 3.3 \end{array} \qquad \begin{array}{l} 2x - 2.6 < -4 \\ 2x - 2.6 + 2.6 < -4 + 2.6 \\ 2x < -1.4 \\ \frac{2x}{2} < \frac{-1.4}{2} \\ x < -0.7 \end{array}$$

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16. $|4 + x| + 8 < 11$ $-7 < x < -1$



$$|4 + x| + 8 - 8 < 11 - 8$$

$$|4 + x| < 3$$

$$4 + x < 3$$

$$4 + x > -3$$

$$4 - 4 + x < 3 - 4$$

$$4 - 4 + x > -3 - 4$$

$$x < -1$$

$$x > -7$$

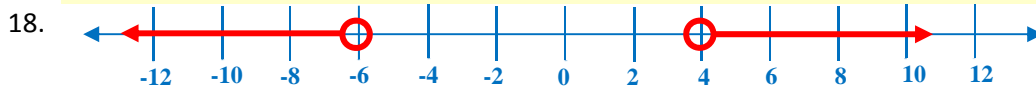
For each graph, write an open sentence involving absolute value.



Midpoint: 5

Distance from midpoint: 4

$$|x - 5| = 4$$



Midpoint: -1

Distance from midpoint: 5

$$|x + 1| > 5$$

19. Ms. Smith' geometry class has a final grades range of 70 to 100. Write an absolute value inequality describing the range of the final grades.

$$70 \leq x \leq 100$$

Midpoint:

$$\frac{100 + 70}{2} = \frac{170}{2} = 85$$

Distance from midpoint:

$$\begin{aligned} |100 - 85| &= 15 \\ |70 - 85| &= 15 \end{aligned}$$

$$|x - 85| \leq 15$$

20. Ultraviolet light has a frequency range of 0.8 Phz to 30 Phz Write an absolute value inequality describing the frequency range of ultraviolet light.

$$0.8Phz \leq x \leq 30Phz$$

Midpoint:

$$\frac{0.8 + 30}{2} = \frac{30.8}{2} = 15.4$$

Distance from midpoint:

$$\begin{aligned} |0.8 - 15.4| &= 14.6 \\ |30 - 15.4| &= 14.6 \end{aligned}$$

$$|x - 15.4| \leq 14.6$$