

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. $|x + 3| < 18$

$x + 3 < 18$

$x + 3 - 3 < 18 - 3$

$x < 15$

$-21 < x < 15$

$x + 3 > -18$

$x + 3 - 3 > -18 - 3$

$x > -21$

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

$x - 4 \leq 18$

$x - 4 + 4 \leq 18 + 4$

$x \leq 22$

$-14 \leq x \leq 22$

$x - 4 \geq -18$

$x - 4 + 4 \geq -18 + 4$

$x \geq -14$

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

$2x + 7 > 5$

$2x + 7 - 7 > 5 - 7$

$2x > -2$

$\frac{2x}{2} > \frac{-2}{2}$

$x > -1$

$x > -1 \text{ or } x < -6$

$2x + 7 < -5$

$2x + 7 - 7 < -5 - 7$

$2x < -12$

$\frac{2x}{2} < \frac{-12}{2}$

$x < -6$

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

$2x + 3 \geq 13$

$2x + 3 - 3 \geq 13 - 3$

$2x \geq 10$

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

$x \geq 5$

$x \geq 5 \text{ or } x \leq -8$

$2x + 3 \leq -13$

$2x + 3 - 3 \leq -13 - 3$

$2x \leq -16$

$\frac{2x}{2} \leq \frac{-16}{2}$

$x \leq -8$

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

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

$|5x + 2| \geq 27$

$5x + 2 \geq 27$

$5x + 2 - 2 \geq 27 - 2$

$5x \geq 25$

$\frac{5x}{5} \geq \frac{25}{5}$

$x \geq 5$

$5x + 2 \leq -27$

$5x + 2 - 2 \leq -27 - 2$

$5x \leq -29$

$\frac{5x}{5} \leq \frac{-29}{5}$

$x \leq -\frac{29}{5}$

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

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

$|3x + 7| < 11$

$3x + 7 < 11$

$3x + 7 - 7 < 11 - 7$

$3x < 4$

$\frac{3x}{3} < \frac{4}{3}$

$x < \frac{4}{3}$

$3x + 7 > -11$

$3x + 7 - 7 > -11 - 7$

$3x > -18$

$\frac{3x}{3} > \frac{-18}{3}$

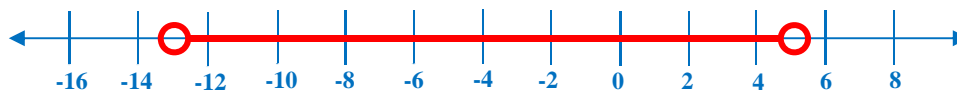
$x > -6$

Absolute Value Equations and Inequalities Assignment

Solve each inequality then graph its solution.

13. $|x + 4| < 9$

$-13 < x < 5$



$x + 4 < 9$

$x + 4 > -9$

$x + 4 - 4 < 9 - 4$

$x + 4 - 4 > -9 - 4$

$x < 5$

$x > -13$

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

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



$|3x - 1| - 2 + 2 \leq 12 + 2$

$|3x - 1| \leq 14$

$3x - 1 \leq 14$

$3x - 1 \geq -14$

$3x - 1 + 1 \leq 14 + 1$

$3x - 1 + 1 \geq -14 + 1$

$3x \leq 15$

$3x \geq -13$

$\frac{3x}{3} \leq \frac{15}{3}$

$\frac{3x}{3} \geq \frac{-13}{3}$

$x \leq 5$

$x \geq -\frac{13}{3}$

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

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



$2x - 2.6 > 4$

$2x - 2.6 < -4$

$2x - 2.6 + 2.6 > 4 + 2.6$

$2x - 2.6 + 2.6 < -4 + 2.6$

$> 4 + 2.6$

$< -4 + 2.6$

$2x > 6.6$

$2x < -1.4$

$\frac{2x}{2} > \frac{6.6}{2}$

$\frac{2x}{2} < \frac{-1.4}{2}$

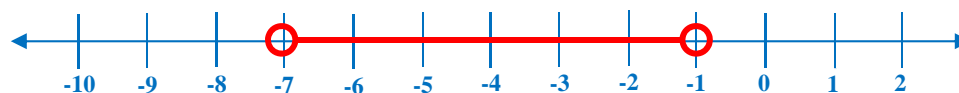
$x > 3.3$

$x < -0.7$

Absolute Value Equations and Inequalities Assignment

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

$-7 < x < -1$



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

$|4 + x| < 3$

$4 + x < 3$

$4 + x > -3$

$4 - 4 + x < 3 - 4$

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

$x < -1$

$x > -7$

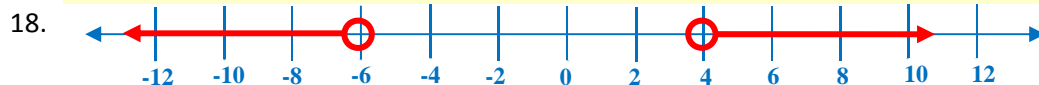
For each graph, write an open sentence involving absolute value.



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:

$|100 - 85| = 15$

$|70 - 85| = 15$

$|x - 85| \leq 15$

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:

$|0.8 - 15.4| = 14.6$

$|30 - 15.4| = 14.6$

$|x - 15.4| \leq 14.6$