

Solving Absolute Value Equations and Inequalities

Solve, and then represent your answers graphically.

1. $|8x-3| > 21$ $8x-3 > 21$ or $8x-3 < -21$
 $8x > 24$ \downarrow $8x < -18$
 $x > 3$ or $x < -\frac{9}{4}$

2. $|y-2| \leq 7$ $y-2 \leq 7$ and $y-2 \geq -7$
 $y \leq 9$ and $y \geq -5$

3. $|5x+8| < 23$ $5x+8 < 23$ and $5x+8 > -23$
 $5x < 15$ \downarrow $5x > -31$
 $x < 3$ and $x > -\frac{31}{5}$

4. $|9-2x| = 5$
 $9-2x = 5$ $9-2x = -5$
 $-2x = -4$ $-2x = -14$
 $x = 2$ $x = 7$

5. $|x| = 4$
 $x = 4$ $x = -4$

6. $|\frac{1}{2}y-3| \geq 3$ $\frac{1}{2}y-3 \geq 3$ or $\frac{1}{2}y-3 \leq -3$
 $\frac{1}{2}y \geq 6$ \downarrow $\frac{1}{2}y \leq 0$
 $y \geq 12$ or $y \leq 0$

7. $|y+9| \leq -2$ $y+9 \leq -2$ and $y+9 \geq 2$
 $y \leq -11$ and $y \geq -7$
 not possible

8. $|y+\frac{1}{3}| > \frac{4}{3}$ $y+\frac{1}{3} > \frac{4}{3}$ or $y+\frac{1}{3} < -\frac{4}{3}$
 $y > \frac{3}{3}$ or $y < -\frac{5}{3}$
 $y > 1$ or $y < -\frac{5}{3}$

9. $|-4x+3| > 13$ $-4x+3 > 13$ or $-4x+3 < -13$
 $-4x > 10$ $-4x < -16$
 $x < -\frac{5}{2}$ or $x > 4$

10. $|m+5|+9 \leq 16$ $m+5 \geq -7$
 $m+5 \leq 7$ and $m \geq -12$
 $m \leq 2$