Section 2.3 Solving Inequalities Using Multiplication or Division

Core Concepts

* Multiplication and Division Properties of Inequality $(c > 0)$

Multiplying or dividing each side of an inequality by the same *positive* number produces an equivalent inequality.

* Multiplication and Division Properties of Inequality $(c < 0)$

When multiplying or dividing each side of an inequality by the same *negative* number, the direction of the inequality symbol must be reversed to produce an equivalent inequality.

In the inequalities above, you can replace $<$ with $\leq$ and $>$ with $\geq$.

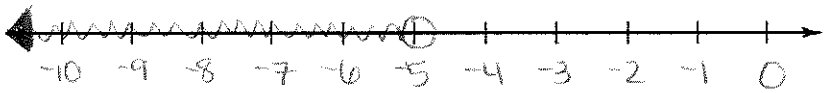
Extra Practice

Solve the inequality. Graph the solution.

1. $\frac{6x}{6} < \frac{-30}{6}$

$x < -5$

$\{x \mid x < -5\}$



2. $\frac{48}{16} \leq \frac{16f}{16}$

$3 \leq f$

$f \geq 3$

$\{f \mid f \geq 3\}$

3. $-\frac{6}{7} \leq \frac{3}{7}f$

$\frac{7}{3}\left(\frac{2}{7}f\right) \geq \left(-\frac{6}{7}\right)\frac{7}{3}$

$f \geq -2$

$\{f \mid f \geq -2\}$

$\frac{m}{-4} \geq \frac{16}{-4}$

$m \leq 4$

$\{m \mid m \leq 4\}$

5. $\frac{x}{-6} > \frac{1}{3}\left(\frac{-6}{1}\right)$

$x < -2$

$\{x \mid x < -2\}$

6. $1 \leq \frac{1}{4}y$

$4\left(\frac{1}{4}y\right) \geq (1)4$

$y \geq 4$

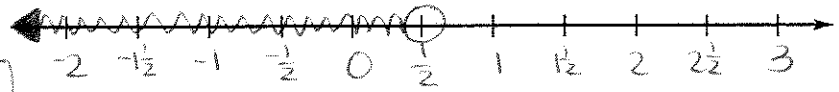
$\{y \mid y \geq 4\}$

7. $-2 < -4x$

$\frac{-4x}{-4} > \frac{-2}{-4}$

$x < \frac{1}{2}$

$\{x \mid x < \frac{1}{2}\}$

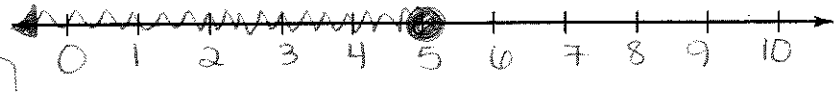


8. $-\frac{2}{5}x \geq (-2)^5$

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

$x \leq 5$

$\{x \mid x \leq 5\}$



9. There are at most 36 red and blue marbles in a bag. The number of red marbles is twice the number of blue marbles. Write and solve an inequality that represents the greatest number of red marbles r in the bag.

x = # of blue

$2x$ = # of red

$(x) + (2x) \leq 36$

$\frac{3x}{3} \leq \frac{36}{3}$

$x \leq 12$

Red. $2(12) = 24$

Greatest # of Red = 24