When graphing inequalities, it is often easier to visualize the solution when the variable is on the left side of the inequality symbol.

Equations and Inequalities
In an equation, if $a = b$, then $b = a$. In an inequality, if $a < b$, then $b > a$.
Example: $7 = 2 + 5$ and
$2 + 5 = 7$
$2 + 8 > 7$
but $7 < 2 + 8$

Example 2

Tools Tutor

Solve $3 \le b - 1\frac{1}{3}$. Graph the solution on a number line.

$3 \le b - 1\frac{1}{3}$ Write the inequality.

$3 + 1\frac{1}{3} \le b - 1\frac{1}{3} + 1\frac{1}{3}$ Addition Property of Inequality

$4\frac{1}{3} \le b$ or $b \ge 4\frac{1}{3}$ Simplify.

The solution is $b \ge 4\frac{1}{3}$.

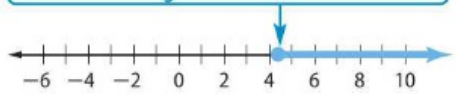
Check $3 \le b - \frac{1}{3}$ Write the inequality.

$3 \stackrel{?}{\le} 4\frac{1}{3} - 1\frac{1}{3}$ Replace b with $4\frac{1}{3}$.

$3 \le 3$ ✓ The statement is true.

Graph the solution.

Since the inequality symbol is $\ge$, draw a closed dot at $4\frac{1}{3}$ with an arrow to the right.

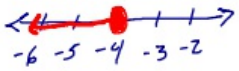


2a. $3 \ge g + 7$

$-7 \quad -7$

$-4 \ge g$

$g \le -4$



2b. $b + \frac{5}{7} > 2$

$-\frac{5}{7} \quad -\frac{5}{7}$

$b > 1\frac{2}{7}$

Got It? Do these problems to find out.

Solve each equation. Graph the solution on a number line.

2a. $3 \ge g + 7$ **2b.** $b + \frac{5}{7} > 2$

Positive Number
The statement $c > 0$ means that c is a positive number.

Key Concept Multiplication and Division Properties

Words When you multiply or divide each side of an inequality by the same *positive* number, the inequality remains true.

Symbols For all numbers a, b, and c, where $c > 0$,

1. If $a < b$, then $ac < bc$ and $\frac{a}{c} < \frac{b}{c}$.
2. If $a > b$, then $ac > bc$ and $\frac{a}{c} > \frac{b}{c}$.

Examples

$-6 < 10$	$20 > 16$
$-6 \cdot 2 < 10 \cdot 2$	$\frac{20}{4} > \frac{16}{4}$
$-12 < 20$	$5 > 4$

These properties are also true for $a \le b$ and $a \ge b$.

Some inequalities, like $4x > 8$, are solved by multiplication or division. You can multiply or divide each side of an inequality by a positive number and the inequality is still true.