

8.7 Solve One-Step Inequalities

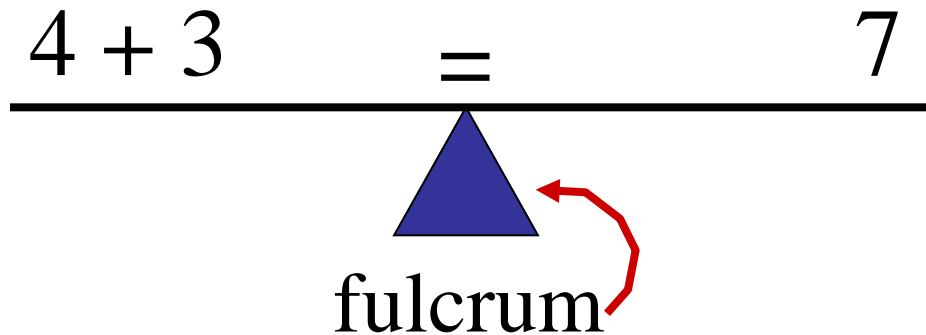
Objective: To solve and graph one-step inequalities




Equations

Equation - a balanced statement of equality between two quantities.

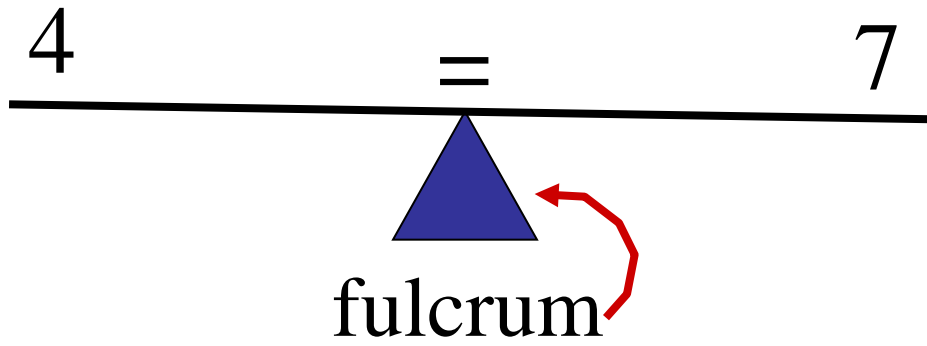
$$4 + 3 = 7$$

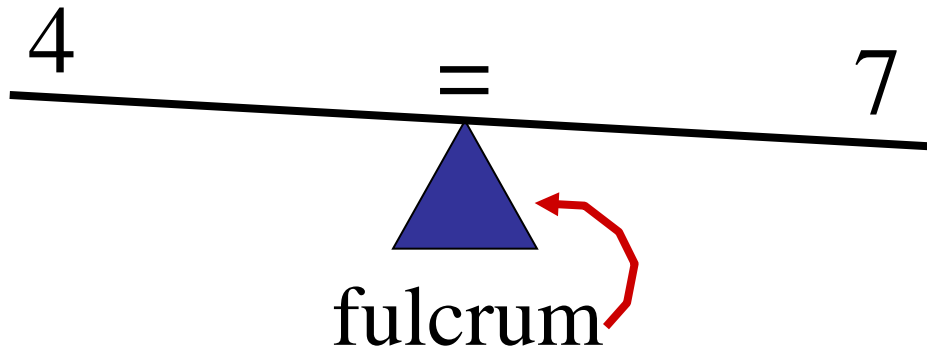


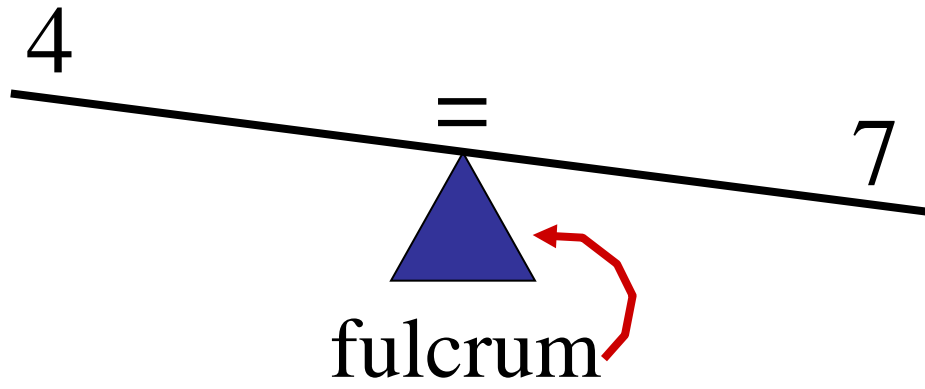

$$\begin{array}{r} 4 + 3 \\ - 3 \end{array} = 7$$


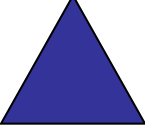
fulcrum

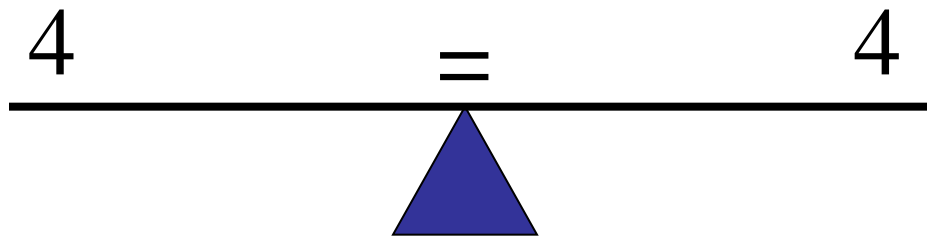
The diagram illustrates the concept of a fulcrum in a mathematical equation. A horizontal line represents the fulcrum, with a blue triangle underneath it. The word "fulcrum" is written below the triangle. A red arrow points from the word "fulcrum" to the triangle. The equation $4 + 3 = 7$ is written above the line, and $- 3$ is written below the line. A red diagonal line is drawn through the $4 + 3$ part of the equation.








$$\frac{4 + 3}{- 3} = \frac{7}{- 3}$$


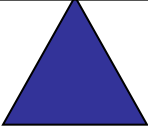
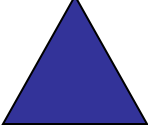


A balance scale diagram. A horizontal black line represents the beam, supported by a blue triangle representing the fulcrum. The number '4' is written above the left end of the beam, and another '4' is written above the right end. An equals sign '=' is positioned in the center of the beam, directly above the fulcrum.

$$4 = 4$$

Perform the same operation to both sides
to keep the equation balanced.

Use the same property to solve equations.

$$\begin{array}{r} x + 6 \\ \hline -6 \end{array} = \begin{array}{r} 11 \\ \hline -6 \end{array}$$

$$\begin{array}{r} x \\ \hline \end{array} = \begin{array}{r} 5 \\ \hline \end{array}$$


Algebraic Approach

$$\begin{array}{r} x + 6 = 11 \\ -6 \quad -6 \\ \hline x = 5 \end{array}$$

Rules for Transforming Equations

- Goal: Isolate the variable on one side of the inequality/equation
- Always perform the same operation to both sides of the inequality/equation
- To undo an operation, perform its inverse operation

$$+ \rightarrow -$$

$$- \rightarrow +$$

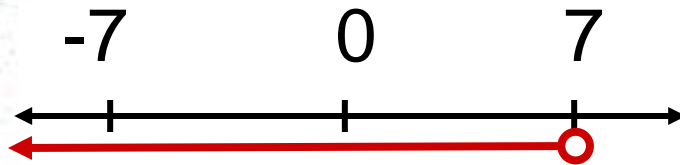
$$\rightarrow \div$$

$$\div \rightarrow \times$$

Solve and Graph the Inequality

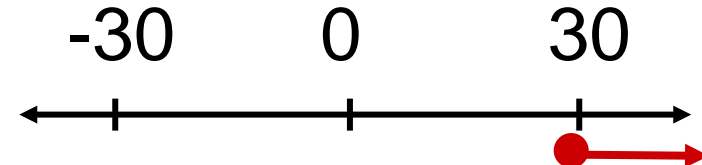
$$1) \quad \begin{array}{r} 3 + x < 10 \\ -3 \quad -3 \end{array}$$

$$x < 7$$



$$2) \quad \begin{array}{r} X - 12 \cdot 18 \\ + 12 \quad +12 \end{array}$$

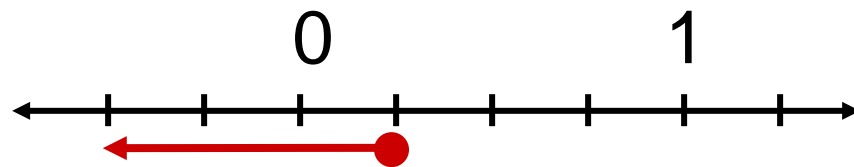
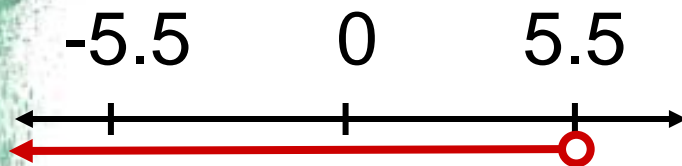
$$x \cdot 30$$



Solve and Graph the Inequality

$$\begin{array}{r} 3) \quad x + 2.5 < 8 \\ \quad - 2.5 - 2.5 \\ \hline \quad \quad x < 5.5 \end{array}$$

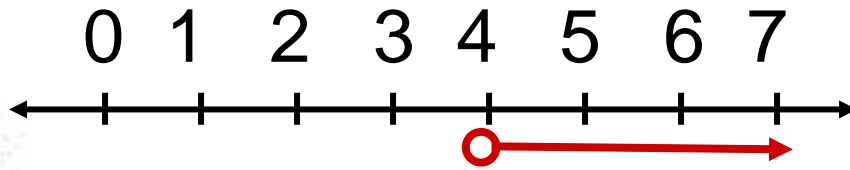
$$\begin{array}{r} 4) \quad x + \frac{1}{4} < \frac{1}{2} \\ \quad - \frac{1}{4} - \frac{1}{4} \\ \hline \quad \quad x < \frac{1}{4} \end{array}$$



Solve and Graph the Inequality

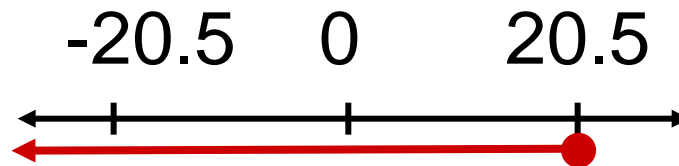
$$5) \frac{3x}{3} > \frac{12}{3}$$

$$x > 4$$



$$6) \frac{10.25}{0.5} \cdot \frac{0.5p}{0.5}$$

$$20.5 \cdot p \text{ OR } p \cdot 20.5$$

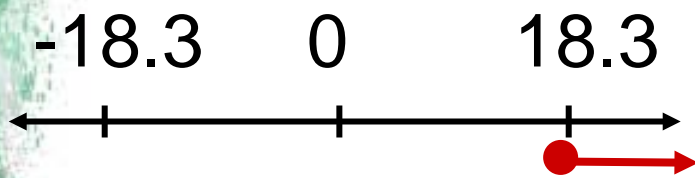


Solve and Graph the Inequality

$$7) \quad \frac{b}{3} \geq 6.1$$

$$\cancel{3} \bullet \frac{b}{\cancel{3}} \geq 6.1 \bullet 3$$

$$b \bullet 18.3$$



$$8) \quad \frac{4}{5}x < 20$$

$$4 \cancel{x} \div 5 < 20$$
$$\bullet 5 \quad \bullet 5$$

$$\frac{4 \bullet x}{\cancel{4}} < \frac{100}{\cancel{4}}$$

$$x < 25$$

