

# INEQUALITIES

- To solve a linear inequality follow the same rules you know for solving linear equations but remember there is one more special rule for linear inequalities.
- Whenever you multiply or divide in the process of solving for the variable you have to remember to reverse (flip, switch) the inequality symbol.

Example 1: Solve for the variable and clearly identify your solution.

$$14x + 5 \geq 6x - 1$$









Example 2: Solve for the unknown.

$$15 + 8x > 10x + 21$$

Example 3: Find the solution to the given inequality. Justify your answer.

$$5x \pm 4x \geq 7 + x - 3$$

### Graphing Inequalities on a Number Line

$x \leq -3$ 	$-2 < x \leq 0$ 
$x \in \mathbb{R}$ 	$10 > x$ 
$x < 8 \text{ and } x > 11$ 	$x \neq -4$ 
$x \geq 0$ 	$x < 5$ 

## APPLICATION OF INEQUALITIES TO RADICALS

- To determine when a given radical is defined: For any radical with an even index solve the inequality *radicand*  $\geq 0$
- To determine when a given radical is undefined: For any radical with an even index solve the inequality *radicand*  $< 0$
- To determine the restrictions on a variable: For any radical with an even index solve the inequality *radicand*  $\geq 0$
- To determine the non-permissible values (NPVs): For any radical with an even index solve the inequality *radicand*  $< 0$

Example 1: Determine when is the given radical defined.

$\sqrt[4]{2x + 1}$	$\sqrt{4 - x}$
$\sqrt[3]{x^2 - 3}$	$\sqrt{x}$

Example 2: Determine when is the given radical undefined.

$$\sqrt[4]{x-2}$$

$$\sqrt{x(x+9)}$$

$$\sqrt[3]{x^2+1}$$

$$\sqrt{-5x}$$

$$\sqrt[5]{x+4}$$

$$\sqrt{abc}$$

Example 3: Determine restrictions on a variable (variables)

$$\sqrt[4]{x+4}$$

$$\sqrt{4-x^2}$$

$$\sqrt[3]{x^2-3}$$

$$\sqrt{2ab}$$

$$\sqrt{x^2+3}$$

$$\sqrt[6]{x^2-5}$$

Example 4: Determine the non-permissible values (if they exist).

$$\sqrt[4]{x+14}$$

$$\sqrt{-x^2+8}$$

$$\sqrt[5]{x^2-3}$$

$$\sqrt{-4abc}$$

$$\sqrt{x-\frac{3}{5}}$$

$$\sqrt[6]{x^2}$$

