

Chapter 4 Inequalities

Y Chart

1–8. Sample answers are given.

1.

Writing equations	Writing inequalities
<ul style="list-style-type: none">• The sign between two expressions is an equal sign, =.• One number is the solution.	<ul style="list-style-type: none">• The sign between two expressions is an inequality symbol: $<$, $>$, \leq or \geq.• More than one number can be a solution.
<ul style="list-style-type: none">• Write one expression on the left and one expression on the right.• Look for key phrases to determine which operation(s) to use: +, -, \times, or \div.• Look for key phrases to determine where to place the equal or inequality sign.	

2.

Graphing the solution of an equation	Graphing the solution of an inequality
<ul style="list-style-type: none">• A solution is represented by a closed circle, \bullet.• One number is the solution.	<ul style="list-style-type: none">• The endpoint of the graph can be an open circle, \circ, or a closed circle, \bullet.• An arrow pointing to the left or the right shows that the graph continues in that direction.• More than one number can be a solution.
<ul style="list-style-type: none">• Solve for the variable.• Graph the solution on a number line.	

3.

Graphing inequalities that use $>$	Graphing inequalities that use $<$
<ul style="list-style-type: none">• For x greater than a number, use an arrow pointing to the right.	<ul style="list-style-type: none">• For x less than a number, use an arrow pointing to the left.
<ul style="list-style-type: none">• Use a number line to graph the solution.• Use an open circle, \circ.• Use an arrow to show that the graph continues.• Solution usually includes many numbers.	

Chapter 4 (continued)

4. Graphing inequalities that use $>$ or $<$

- Use an open circle, \circ .

Graphing inequalities that use \geq or \leq

- Use a closed circle, \bullet .

- Use a number line.
- Use an arrow to show that the graph continues.

5. Solving inequalities using addition

- Use the Addition Property of Inequality: When you add the same number to each side of an inequality, the inequality remains true.

$$\begin{array}{r} \text{Example: } x - 5 > 8 \\ +5 \quad +5 \\ \hline x > 13 \end{array}$$

Solving inequalities using subtraction

- Use the Subtraction Property of Inequality: When you subtract the same number from each side of an inequality, the inequality remains true.

$$\begin{array}{r} \text{Example: } x + 5 > 8 \\ -5 \quad -5 \\ \hline x > 3 \end{array}$$

- Use inverse operations to group numbers on one side.
- Use inverse operations to group variables on one side.
- Solve for the variable.

Chapter 4 (continued)

6. Solving inequalities using multiplication

- Use the Multiplication Property of Inequality (Case 1): When you multiply each side of an inequality by the same *positive* number, the inequality remains true.

Example: $\frac{x}{5} > 10$
 $\frac{x}{5} \cdot 5 > 10 \cdot 5$
 $x > 50$

- Use the Multiplication Property of Inequality (Case 2): When you multiply each side of an inequality by the same *negative* number, the direction of the inequality symbol must be reversed for the inequality to remain true.

Example: $-\frac{1}{2}x \leq 10$
 $-\frac{2}{1} \cdot (-\frac{1}{2}x) \geq -\frac{2}{1} \cdot 10$
 $x \geq -20$

Solving inequalities using division

- Use the Division Property of Inequality (Case 1): When you divide each side of an inequality by the same *positive* number, the inequality remains true.

Example: $5x > 10$
 $\frac{5x}{5} > \frac{10}{5}$
 $x > 2$

- Use the Division Property of Inequality (Case 2): When you divide each side of an inequality by the same *negative* number, the direction of the inequality symbol must be reversed for the inequality to remain true.

Example: $-3x \geq 9$
 $\frac{-3x}{-3} \leq \frac{9}{-3}$
 $x \leq -3$

- Use inverse operations to group numbers on one side.
- Use inverse operations to group variables on one side.
- Solve for the variable.

7. Solving two-step equations

- The sign between two expressions is an equal sign, =.
- One number is the solution.

Solving two-step inequalities

- The sign between two expressions is an inequality symbol: <, >, ≤, or ≥.
- More than one number can be a solution.

- Use inverse operations to isolate the variable.
- Group numbers on one side, variables on the other side, and solve for the variable.

8. Adding integers with the same sign

- Add the absolute values of the integers. Then use the common sign.

Adding integers with different signs

- Subtract the lesser absolute value from the greater absolute value. Then use the sign of the integer with the greater absolute value.

- Sums can be negative or positive.