



Inequalities and Their Graphs

Unit 3 Lesson 1

INEQUALITIES AND THEIR GRAPHS

Students will be able to:

recognize and check solutions of inequalities; and
graph inequalities .

Key Vocabulary:

- Inequality
- Solution of an Equality
- Graph of an Equality

INEQUALITIES AND THEIR GRAPHS

INEQUALITY is a mathematical sentence that uses an inequality symbol to compare the values of two expressions.

$<$	$>$	\leq	\geq	\neq
less than	greater than	less than or equal to	greater than or equal to	is not equal to
is under	is more than	maximum	minimum	is not the same as
is below	above	bottom	top	is different from
is lower than	over	is not greater than	is not less than	differs from
is fewer than	larger than	is at most	is at least	
shorter than	exceeds	is no more than		
smaller than	increased			
beneath	longer than			
a better deal	is higher than			

INEQUALITIES AND THEIR GRAPHS

Sample Problem 1: Determine if each inequality is true or false.

A. $3 + 2 > 7 - 3$

B. $-8 + 3 \leq 3 - 8$

C. $5 + 6 \geq 10 + 2$

D. $9 + 4 < 6 + 1 + 6$

INEQUALITIES AND THEIR GRAPHS

Sample Problem 1: Determine if each inequality is true or false.

A. $3 + 2 > 7 - 3$ TRUE

$$5 > 4$$

B. $-8 + 3 \leq 3 - 8$ TRUE

$$-5 \leq -5$$

C. $5 + 6 \geq 10 + 2$ FALSE

$$11 \geq 12$$

D. $9 + 4 < 6 + 1 + 6$ FALSE

$$13 < 13$$

INEQUALITIES AND THEIR GRAPHS

Sample Problem 2: Write each algebraic expression from the verbal expression.

- A. The sum of x and 16 is greater than or equal to 32.
- B. The product of 13 and x is less than 36.
- C. The difference of x and 9 is greater than 21.
- D. The ratio of x and 4 is less than or equal to 15.

INEQUALITIES AND THEIR GRAPHS

Sample Problem 2: Write each algebraic expression from the verbal expression.

A. The sum of x and 16 is greater than or equal to 32. $x + 16 \geq 32$

B. The product of 13 and x is less than 36. $13x < 36$

C. The difference of x and 9 is greater than 21. $x - 9 > 21$

D. The ratio of x and 4 is less than or equal to 15. $\frac{x}{4} \leq 15$

INEQUALITIES AND THEIR GRAPHS

SOLUTION OF AN INEQUALITY is any number that produces a true statement when it is substituted for the variable in the inequality.

INEQUALITIES AND THEIR GRAPHS

Sample Problem 3: Determine whether 6 is the solution for each inequality.

A. $2x - 3 < 8$

B. $x - 5 \geq 1$

C. $x + 6 > 11$

D. $12 + x \leq 17$

INEQUALITIES AND THEIR GRAPHS

Sample Problem 3: Determine whether 6 is the solution for each inequality.

A. $2x - 3 < 8$

$$2(\mathbf{6}) - 3 < 8$$

$$12 - 3 < 8$$

$$\mathbf{9 < 8}$$

6 is not a
solution

B. $x - 5 \geq 1$

$$\mathbf{6} - 5 \geq 1$$

$$\mathbf{1 \geq 1}$$

6 is a
solution

C. $x + 6 > 11$

$$\mathbf{6} + 6 > 11$$

$$\mathbf{12 > 11}$$

6 is a
solution

D. $12 + x \leq 17$

$$12 + \mathbf{6} \leq 17$$

$$\mathbf{18 \leq 17}$$

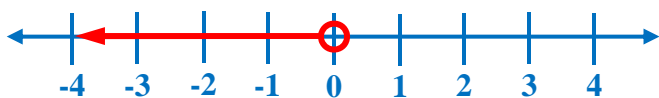
6 is not a
solution

INEQUALITIES AND THEIR GRAPHS

GRAPH an inequality is the set of points on a number line that represent all solutions of the inequality.

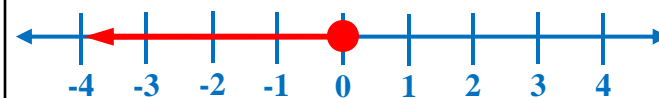
OPEN CIRCLE ○

$$x < 0$$

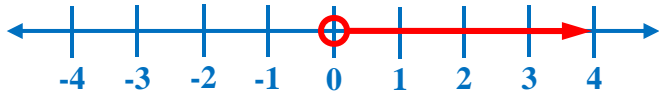


CLOSED CIRCLE ●

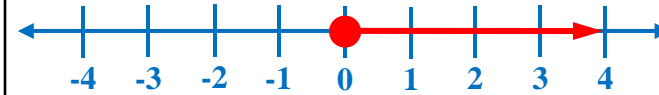
$$x \leq 0$$



$$x > 0$$



$$x \geq 0$$



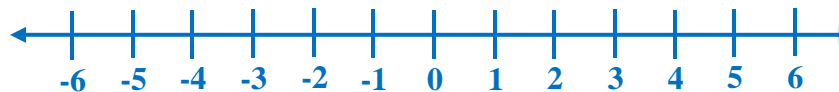
INEQUALITIES AND THEIR GRAPHS

Sample Problem 4: Graph each inequality.

A. $x < -5$



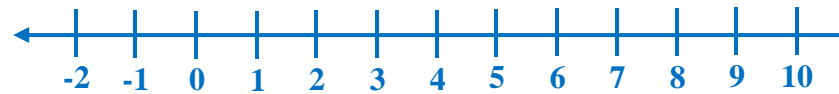
B. $x \geq 3$



C. $x > -4$



D. $x \leq 8$



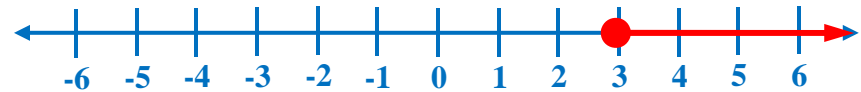
INEQUALITIES AND THEIR GRAPHS

Sample Problem 4: Graph each inequality.

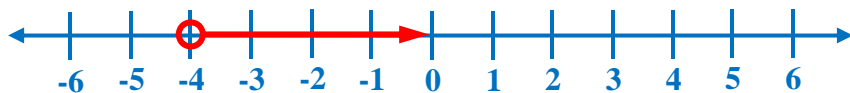
A. $x < -5$



B. $x \geq 3$



C. $x > -4$



D. $x \leq 8$

