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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.

$a < b$	a less than b
$a > b$	a greater than b
$a \neq b$	a is not equal to b
$a \leq b$	a less than or equal to b
$a \geq b$	a greater than or equal to b

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

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

$13 < 13$

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.

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. $\frac{x}{4} \geq 15$

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

Sample Problem 3: Determine whether $\boldsymbol{6}$ is the solution for each inequality.

A. $\boldsymbol{2x - 3 < 8}$

B. $\boldsymbol{x - 5 \geq 1}$

C. $\boldsymbol{x + 6 > 11}$

D. $\boldsymbol{12 + x \leq 17}$

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

A. $2x - 3 < 8$

$2(6) - 3 < 8$

$12 - 3 < 8$

$9 < 8$

6 is not a solution

B. $x - 5 \geq 1$

$6 - 5 \geq 1$

$1 \geq 1$

6 is a solution

C. $x + 6 > 11$

$6 + 6 > 11$

$12 > 11$

6 is a solution

D. $12 + x \leq 17$

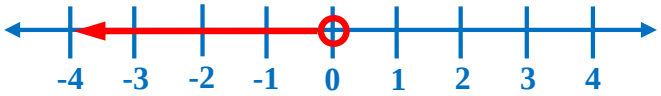
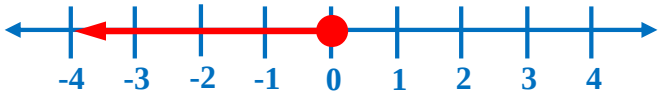
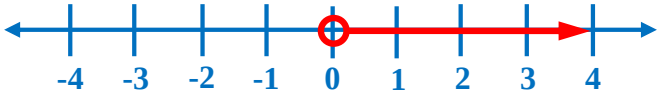
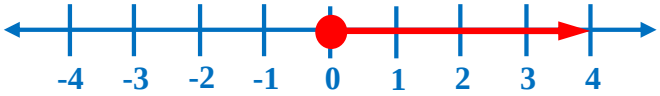
$12 + 6 \leq 17$

$18 \leq 17$

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 ○		CLOSED CIRCLE ●
$x < 0$		$x \leq 0$	
$x > 0$		$x \geq 0$	

Sample Problem 4: Graph each inequality.

A. $x < -5$

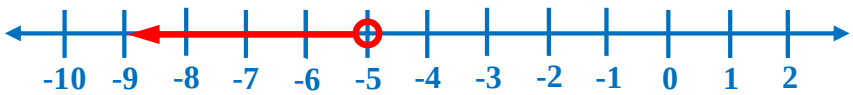
B. $x \geq 3$

C. $x > -4$

D. $x \leq 8$

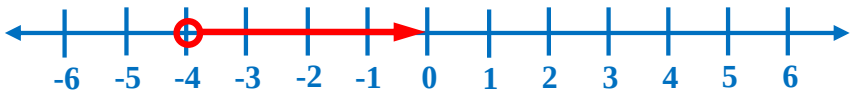
Sample Problem 4: Graph each inequality.

A. $x < -5$



B. $x \geq 3$

C. $x > -4$



D. $x \leq 8$