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Inequalities and Their Graphs Guide Notes

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 below is lower than is fewer than shorter than smaller than beneath a better deal	is more than above over larger than exceeds increased longer than is higher than	maximum bottom is not greater than is at most is no more than	minimum top is not less than is at least	is not the same as is different from differs from

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. $x + 16 \geq 32$

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 6 is the solution for each inequality.

A. $2x - 3 < 8$ 6 is not a solution

$2(6) - 3 < 8$

$12 - 3 < 8$

$9 < 8$

B. $x - 5 \geq 1$ 6 is a solution

$6 - 5 \geq 1$

$1 \geq 1$

C. $x + 6 > 11$ 6 is a solution

D. $12 + x \leq 17$ 6 is not a solution

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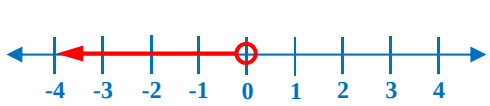
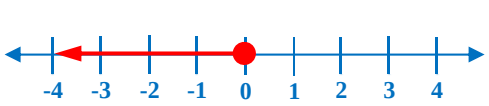
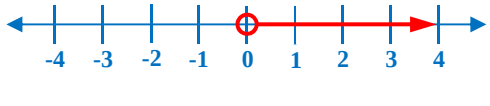
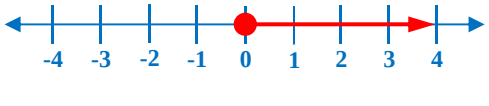
$6 + 6 > 11$
$12 > 11$

$12 + 6 \leq 17$
$18 \leq 17$

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

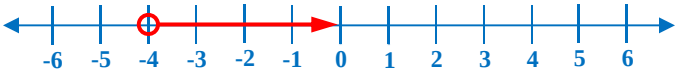
OPEN CIRCLE ○	CLOSED CIRCLE ●
$x < 0$ 	$x \leq 0$ 
$x > 0$ 	$x \geq 0$ 

Sample Problem 4: Graph each inequality.

A. $x < -5$

B. $x \geq 3$

C. $x > -4$



D. $x \leq 8$