

INEQUALITY SYMBOLS:

>	greater than/more than/exceeds
<	less than/fewer than
≥	greater than or equal to/at least/no less/minimum
≤	less than or equal to/at most/no more than/up to/maximum

EXAMPLES:

Translate the following statements using an inequality symbol: ("x" = temperature)

a) the temperature is more than 10° $x > 10^\circ$

b) the temperature is at least 10° $x \geq 10^\circ$

c) the temperature is less than 10° $x < 10^\circ$

d) the temperature is at most 10° $x \leq 10^\circ$

In a class, there are 3 more girls than boys. Let "x" represent the number of boys in the class. Translate each of the following situations.

a) There are at least 30 students in the class $2x + 3 \geq 30$

b) There are 23 students or less in the class $2x + 3 \leq 23$

c) There are 28 students or more in the class $2x + 3 \geq 28$

d) There are at most 26 students in the class $2x + 3 \leq 26$

e) There are less than 30 students in the class $2x + 3 < 30$

f) There are more than 32 students in the class $2x + 3 > 32$

g) There are at least 20 students and at most 25 students in the class $20 \leq 2x + 3 \leq 25$

h) There are more than 23 students and at most 28 students in the class $23 < 2x + 3 \leq 28$

G $x + 3$
B x

$2x + 3 \geq 20$

INEQUALITIES

- Represent each of the following as an algebraic inequality.
 - a) x is at most 30 $x \leq 30$
 - b) the sum of 5x and 2x is at least 14
 $5x + 2x \geq 14$
 - c) the product of x and y is less than or equal to 4
 $xy \leq 4$
 - d) 5 less than a number y is under 20
 $y - 5 < 20$
- Write an inequality to represent the following expressions. Let "x" represent the number.
 - a) If 5 times a number is increased by 4, the result is at least 19
 - b) The sum of twice a number and 5 is at most 15
 - c) Three times a number increased by 8 is no more than the number decreased by 4
 - d) Two-thirds of a number plus 5 is greater than 12.
 - e) The sum of a number and 81 is greater than the product of -3 and that number.
 - f) Four times a number is greater than -48.
 - g) The quotient of a number and 15 is no greater than 450.
 - h) Ten is no more than four less than a number
 - i) The sum of twice a number and 5 is at most 3 less than a number.
- Which statement is modeled by $2p + 5 < 11$?
 - (1) The sum of 5 and 2 times p is at least 11.
 - (2) Five added to the product of 2 and p is less than 11.
 - (3) Two times p plus 5 is at most 11.
 - (4) The product of 2 and p added to 5 is 11.
- Which statement can be modeled by $x + 3 \leq 12$?
 - (1) Sam has 3 bottles of water. Together, Sam and Dave have at most 12 bottles of water.
 - (2) Jennie sold 3 cookbooks. To earn a prize, Jennie must sell at least 12 cookbooks.
 - (3) Peter has 2 baseball hats. Peter and his brothers have fewer than 12 baseball hats.
 - (4) Kathy swam 3 laps in the pool this week. She must swim more than 12 laps.

SOLVING INEQUALITIES

*Isolate the "x"...**FLIP inequality** when ^{multiplies} dividing **NEGATIVES**

The solution set is expressed in 2 ways:

Interval Notation: $[$ = # included $]$ = # excluded $<$ $>$

Number Line: ● = # included ○ = # excluded

$[2, 5[$

i.e.:

$$\begin{aligned} -4x &\leq 19 \\ -4x &\div -4 & \div -4 \\ x &\geq -4 \end{aligned}$$

$$\begin{aligned} \frac{x}{2} - 1 &\leq 1 \\ \frac{x}{2} &\leq 2 \\ 2\left(\frac{x}{2}\right) &\leq (2)^2 \\ x &\leq 20 \end{aligned}$$

$$\begin{aligned} 2(2x - 5) &> 3(x - 2) \\ 4x - 10 &> 3x - 6 \\ -3x & & -6x \\ x - 10 &> -6 \\ x &> 4 \end{aligned}$$