## **<u>1.4: Write Equations and Inequalities</u>**

<b>Goals:</b> *Translate verbal sentences into equations or ine *Decide if a given value is a solution to an equa	equalities tion or inequality
<b>Equation</b> - a mathematical sentence with anequals_	sign
<u>Inequality</u> - a mathematical sentence with anin	equalitysign
< <u>less</u> than	
> <u>greater</u> than	
$\leq$ <u>less</u> than or <u>equal</u> to	
<u>greater</u> than or <u>equal</u>	to
**]	S**
The word <b>IS</b> <u>MUST</u> appear in order to ha inequality	ve an <u>equation</u> or
"is", "is the same as", "is equal to" means to put an	equalssign
"is less than (or equal to)", "is greater than (or equal to)"	'means to put an <u>inequality sign</u> .

Translate the following verbal phrases into equations or inequalities. Be sure to underline key words or phrases.

**Ex:** <u>twice</u> the <u>sum</u> of a number *x* and 6 <u>is greater than</u> 5

$$2(x+6) > 5$$

**Ex:** three <u>times</u> the <u>quotient</u> of a number *y* and 4 <u>is less than or equal to</u> 3.

$$3\left(\frac{y}{4}\right) \le 3$$

**Ex:** The product of *x* and 5, minus 4, <u>is greater than</u> 6.

5x - 4 > 6

**Ex:** The sum of b and 11, divided by 14 is 12.

$$\frac{b+11}{14} = 12$$

**\*\*Ex:** 5 less than the product of 8 and x

$$8x - 5$$

**Ex:** The <u>product</u> of 6 and a number <u>is at least</u> 24

$$6x \ge 24$$

**Ex:** The <u>quotient</u> of a number *p* and 12 is at least 30

$$\frac{p}{12} \ge 30$$

**Ex:** The <u>quotient</u> of a number and 2 is at most 16

$$\frac{x}{2} \le 16$$

## Write an inequality to represent the situation:

Ex: your math grade g, must be at least an 80 this year

 $g \ge 80$ 

**Ex:** The temperature can be at most 105° or you will get sick.

 $T \le 105$ 

<u>Solution</u> – the \_\_value\_\_\_\_\_ of the variable that makes the equation \_\_true\_\_\_\_. (It\_\_works\_\_\_\_\_ when you \_\_substitute\_\_\_\_\_\_ it in)

## Check whether 3 is a solution to the equation or inequality. Yes or No.

<b>Ex:</b> $8 - 2x = 2$	<b>Ex:</b> $4x - 5 = 6$
8 - 2(3) = 2	4(3) - 5 = 6
8 - 6 = 2	12 - 5 = 6
2 = 2 YES	7 = 6 NO!
<b>Ex:</b> $2z + 5 > 12$	<b>Ex:</b> $5 + 3n \le 20$
2(3) + 5 > 12	$5 + 3(3) \le 20$
6 + 5 > 12	$5 + 9 \le 20$
11 > 12 NO!	$14 \le 20$ YES!

Check whether 5 is a solution to the equation or inequality. Yes or No.

<b>Ex:</b> $24 - 3d = 9$	<b>Ex:</b> $3x + 4 = 18$
9 = 9	19 = 18
Yes	No

<b>Ex:</b> $2w - 7 \le 3$	<b>Ex:</b> $4 + 3p > 19$
$3 \leq 3$	19 > 19
Yes	No

Check whether the given number is a solution: (the number given comes after the semi-colon)

<b>Ex:</b> $9 - x = 4; 5$	<b>Ex:</b> $b + 5 < 15; 7$
9 - 5 = 4	7 + 5 < 15
4 = 4	12 < 15
Yes	Yes

**Ex:**  $2n + 3 \ge 21; 9$ 

 $\begin{array}{c} 21 \geq 21 \\ Yes \end{array}$ 

**Ex:** The last time you and 3 friends went to a mountain bike park, you had a coupon for \$10 off the total purchase and paid \$17 for 4 tickets.

a) Identify a variable to represent what you don't know.

*x*: the cost of one ticket

b) Write an equation to represent the situation.

4x - 10 = 17

c) Can you find out what the cost would have been if the group did not have a coupon?

\*Add 10 to the price the group paid, so they should have paid \$27 without a coupon.

d) Can you find the cost of one regular price ticket?

Divide the price they should have paid by 4, since there are 4 people. So they each should have paid \$6.75

Ex: A basketball player scored 351 points last year. The player plans on playing in 18 games this year.

a) Choose a variable to represent what you don't know.

*p*: the number of points he scores per game

b) Write an inequality to represent the situation.

18*p* > 351

c) Will an average of 20 points per game be enough to beat least year's total?

18(20) > 351 360 > 351 Yes

**Ex:** Tyler would like to make no less than \$610 selling coffee mugs online. He plans to sell mugs for \$22 each. Write an inequality to represent the situation, then decide if he sells 28 mugs if he will reach his goal.

*x*: The number of mugs he sells

 $22x \ge 610$  Yes, if sells 28 mugs he will make \$616