

Name: Keyz

Algebra II

Period: _____

Creating Linear Inequalities

Opening Problem: Ann observed the number of roses and cosmos flowers in a garden. She counts 3 roses and sees there are more cosmos flowers than roses. How can you represent this scenario with an inequality?

$x = \# \text{ of cosmos flowers}$

$\therefore \boxed{x > 3}$



Vocabulary:

- **Inequality:** a mathematical sentence that compares two quantities. An inequality involves one of the four symbols $>$, $<$, \geq , or \leq .

Examples of Linear Inequalities

$$\begin{aligned} x &> 3 \\ 6x &< 4x - 8 \\ 8y + 16 &\geq 3y + 4 \end{aligned}$$

Solving Linear Inequalities

Example 1: Solve the inequality

$$\begin{aligned} 4 - 2x &> 7 + x \\ +2x & \quad +2x \end{aligned}$$

$$\begin{aligned} 4 &> 7 + 3x \\ -7 & \quad -7 \end{aligned}$$

$$\begin{aligned} -3 &> 3x \\ \frac{-3}{3} & \quad \frac{3x}{3} \end{aligned}$$

$\boxed{x < -1}$

Example 2: Solve the inequality

$$\begin{aligned} 5y - 8 &\leq 9y + 16 \\ +8 & \quad +8 \end{aligned}$$

$$\begin{aligned} 5y &\leq 9y + 24 \\ -9y & \quad -9y \end{aligned}$$

$$\begin{aligned} -4y &\leq 24 \\ \frac{-4y}{-4} & \quad \frac{24}{-4} \end{aligned}$$

$\boxed{y \geq -6}$

flip the inequality when dividing by a negative

Name: Key

Algebra II

Period:

Creating Linear Inequalities

X

Example 3: Bryan likes to collect marbles. If he adds 5 more marbles to his collection, the total number of marbles with him will be greater than 20. Model this situation with an inequality.

x : # of marbles in his current collection

$$\boxed{x + 5 > 20}$$

Example 4: Dorothy is celebrating her birthday by distributing cakes. After she gives away 3 cakes, the number of cakes left with her is less than 10. Model this situation with an inequality.

x : # of cakes originally

$$\boxed{x - 3 < 10}$$

$$1 + 3x > 10$$

Example 5: One more than 3 times the number of bananas Beth has is greater than 10. Express this as an inequality and solve the inequality.

$$\boxed{1 + 3x > 10}$$

Example 6: Leslie has a budget of \$60 to spend on new clothes for school. She goes to Target where there is a sale going on for \$6 shirts and \$15 pants.

s - # of shirts
 p - # of pants

a.) Model this situation with an inequality.

$$\boxed{6s + 15p \leq 60}$$

b.) If she wants to get three pairs of pants, how many shirts will she be able to buy? Give your answer as an integer.

$$\frac{5}{2} = 2\frac{1}{2}$$

when $p=3$

\therefore She can buy 2 shirts and stay under budget.

$$6s + 15(3) \leq 60$$

$$6s + 45 \leq 60$$

$$\frac{6s}{6} \leq \frac{15}{6} \quad s \leq \frac{5}{2}$$

c.) Leslie has 6 shirts and two pairs of pants in her cart. Will she be able to purchase all of them and stay under her budget?

$$6(6) + 15(2) \leq 60$$

$$36 + 30 \leq 60$$

$$66 \neq 60$$

$\boxed{\text{NO}}$ she must put away one shirt.