# 9/26/19 - Warm Up Problem

Each statement is false. Think of a counterexample for each one to show that it is false.

1. If the product of two numbers is positive, then both of the number are positive.

-2 - 2 = 4

2. The product of two <u>positive</u> numbers is always greater than both of the numbers.

## Concept 6 Worksheet #1 (front)

## REASONING IN ALGEBRA

Fill in the missing justifications for each proof.

1. Given: 
$$\frac{4x+6}{2} = 9$$
  
Prove:  $x = 3$ 

Statement	Justification	
1. $\frac{4x+6}{2} = 9$		
2. $4x + 6 = 18$		
3. $4x = 12$		
4. $x = 3$		

StatementJustification1. 8x-5=2x+1Given2. 6x-5=1Subar Prop.3. 6x=6Addition Prop.4. x=1Division Prop.

3. Given: 5(n-3) = 4(2n-7) - 14Prove: n = 9

n=5

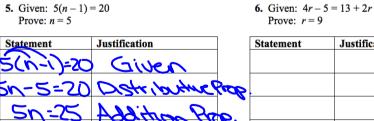
Statement	Justification
1. $5(n-3) = 4(2n-7) - 14$	
2. $5n-15 = 8n-28-14$	
3. $5n-15 = 8n-42$	Simplify
4. $5n = 8n - 27$	
5. $-3n = -27$	
6. <i>n</i> = 9	

4. Given: 2x-15-x=21+10x

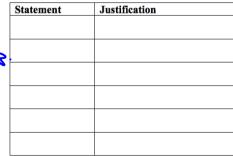
**2.** Given: 8x - 5 = 2x + 1Prove: x = 1

Prove: x = -4

Statement	Justification
1. $2x - 15 - x = 21 + 10x$	
2. $x - 15 = 21 + 10x$	Simplify
3. $-15 = 21 + 9x$	
4. $-36 = 9x$	
5. $-4 = x$	



Divagon



If two lines are perpendicular, then they intersect to form a 90 degree angle.

Write the converse.

IF they intersect to form a 90° angle, then 2 lines are perp.

If the converse is true, write the statement as a biconditional.

Two lines are parp. If and only IF they intersect to form a 90° andlb

## Section 2.5 - Reasoning in Algebra

Goals: Use properties of equality and congruence

## <u>Properties of Equality and Congruence</u>

Property	Example	Explanation
Reflexive Property of Equality	<sup>a=a</sup> 5=5	Any number is equal to itself.
Reflexive Property of Congruence	$\overline{RT} \cong \overline{RT}$ or $\angle 5 \cong \angle 5$	Any figure is congruent to itself.
Symmetric Property of Equality	If $a = b$ , then $b = a$ .	The sides of an equation can be switched.
Symmetric Property of Congruence	If $\overline{LM} \cong \overline{RT}$ , then $\overline{RT} \cong \overline{LM}$ .	The sides of a congruence statement can be switched.
Transitive Property of Equality	If $a = b$ and $b = c$ , then $a = c$ . $5 \sqrt{-5}$ , so $\times -7$	If two numbers are equal to the same number, then they are equal to each other.
Transitive Property of Congruence	If $\angle A \cong \angle B$ and $\angle B \cong \angle C$ , then $\angle A \cong \angle C$ .	If two figures are congruent to the same figure, then they are congruent to each other.
Substitution Property of Equality	If $x + y = z$ and $x = 5$ , then 5 + y = z.	If two expressions are equal, one can replace the other in an equation.

Equal and Congruent - What's the Difference? \*Numbers can be equal to each other. \*Figures can be congruent to each other. The length of a segment and the measure of an angle are numbers. Numbers can be equal. MN = RT $m \angle ABC = m \angle GHJ$ Segments and angles are figures. Figures can be congruent.  $MN \cong RT \qquad \angle ABC \cong \angle GHJ$ 

# Which property of equality or congruence justifies each statement?

1. If  $\overline{ST} \cong \overline{QR}$ , then  $\overline{QR} \cong \overline{ST}$ . Symmetric Prop 2. XY = XY Reflexive Prop. OF =3. If  $\overline{x} = 9$  and x + y = 28, then 9 + y = 28. Suppose 4. If  $\angle ABC \cong \angle DEF$  and  $\angle ABC \cong \angle GHJ$ , then  $\angle DEF \cong \angle GHJ$ . Wanshive Prop  $SF \cong$ 

## Using Substitution and Transitive Properties

The Substitution Property and the Transitive Properties are used in proofs to combine two equations or congruence statements together.

Complete each statement using the given property.

Transitive Property of Congruence If  $\angle RST \cong \angle UVW$  and  $\angle UVW \cong \angle XYZ$ , then  $\angle RST \cong \angle XYZ$ .

Substitution Property of Equality If y + 3x = z and y = 4z then 42 + 3x = 2.

Transitive Property of Equality If  $m \angle 1 + m \angle 2 + 180$  and  $m \angle 3 + m \angle 4 + 180$ , then  $m \angle 1 + m \angle 2 + 180$  and  $m \angle 3 + m \angle 4 + 180$ , then

Substitution Property of Equality  
If 
$$AB + BC = AC$$
 and  $AB = 2 \cdot BC$  then  $2 \cdot BC + BC = AC$ 

## 2.5 reasoning in algebra.notebook

## Assignment:

Concept 6 Worksheet #1 - due Tuesday 10/8 (back)

USING THE PROPERTIES OF EQUALITY AND CONGRUENCE

Identify the property that is being shown in each statement.

7. Given that  $m \angle BCA = m \angle DBC$  and  $m \angle BCA = m \angle ADB$ , we can conclude that  $m \angle DBC = m \angle ADB$ .

8. Given that  $\overline{HI} \cong \overline{JK}$ , we can conclude that

9. Given that  $\angle 3 \cong \angle 4$  and  $\angle 4 \cong \angle 5$ , we can conclude that

10. Given that XY = MN and XY + YZ = XZ, we can state that MN + YZ = XZ.

**11.**  $m \angle ABC = m \angle ABC$ 

#### Use the given property to complete each statement.

12. Substitution Property of Equality: If x + y = 3z and x = 2z, then \_\_\_\_\_ = \_\_\_\_.

**13.** Substitution Property of Equality: If LN = 5x + 12 and x = 2, then LN =\_\_\_\_\_.

14. Symmetric Property of Congruence: If  $\overline{LM} \cong \overline{GH}$ , then  $\underline{\qquad} \cong \underline{\qquad}$ .

15. Symmetric Property of Equality: If x = 4, then \_\_\_\_ = \_\_\_\_.

16. Transitive Property of Congruence: If  $\angle 1 \cong \angle 5$  and  $\angle 2 \cong \angle 5$ , then \_\_\_\_\_  $\cong$  \_\_\_\_\_.

17. Transitive Prop. of Equality: If  $m \angle 1 + m \angle 2 = 180$  and  $m \angle 2 + m \angle 3 = 180$ ,

then \_\_\_\_\_= \_\_\_\_

#### **18.** Given: 2 = 4x - x + 8

Prove: x = -2

Statement	Justification
1. $2 = 4x - x + 8$	Given
2. $2 = 3x + 8$	Simplify
3. $-6 = 3x$	Subtraction Prop.
4. $-2 = x$	Division Prop.
5. x = -2	Symmetric Prop. of =