Name ANSWERS Period Date

ometry 21: Practice with Proofs!

Directions: Complete each of the following proofs.

1. Given: $-2(3x-4)=3x+12$ Prove: $x=-4/9$

Statements	Reasons
1. $-2(3x-4)=3x+12$	1. Given
2. $-6x+8=3x+12$	2 Distributive Prop.
3. $6x=6x$	3 Reflexive POE
4. $8=9x+12$	4 Addition POE
5. $-4=9x$	5 Subtraction POE
6. $-4/9=x$	6 Division POE
7. $x=-4/9$	7 Symmetric POE

2. Given: $9=4x-3(x-2)$ Prove: $x=3$

tements	Reasons
1. $9=4x-3(x-2)$	1 Given
2. $9=4x-3x+6$	2 Distributive
3. $9=x+6$	3 Simplify
4. $6=6$	4 Reflexive POE
5. $3=x$	5 Subtraction POE
6. $x=3$	6 Symmetric POE

3. Given: $3(2x+5)=-2(x-6)$ Prove: $x=-3/8$

Statements	Reasons
1. $3(2x+5)=-2(x-6)$	1 Given
2. $6x+15=-2x+12$	2 Distributive Prop.
3. $8x+15=12$	3 Addition POE
4. $8x=-3$	4 Subtraction POE
5. $x=-3/8$	5 Division POE

4. Given: $\frac{1}{3}(x-9)=3x+4$ Prove: $x=-\frac{21}{8}$

Note, you may not need all spaces provided

Statements	Reasons
1. $3\left(\frac{1}{3}(x-9)\right)=(3x+4)3$	1 Given
2 ~~$3x-9=9x+12$~~	2 ~~Distribute~~ Multpl.
3 $-9=8x+12$	3 Subtraction
4 $-21=8x$	4 Subtraction
5 $\frac{-21}{8}=x$	5 Division
6 $x=-21/8$	6 Symmetric

there are other ways of doing this one!

For the following problems state the property of equality that allows you to justify the conclusion.

5. Given: $x+4=6$

Conclusion: $x=2$

Subtraction POE

6. Given: $\frac{1}{2}x=8$

Conclusion: $x=16$

Multiplication POE

7. Given: $x+y+z=10$ and $y=x$

Conclusion: $y+y+z=10$

Substitution POE

8. Given: $x=a$ and $a=6$

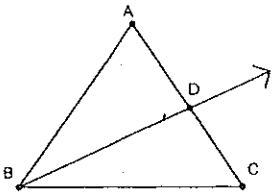
Conclusion: $x=6$

Transitive POE (or substitution)

Complete the following Geometric Proofs.

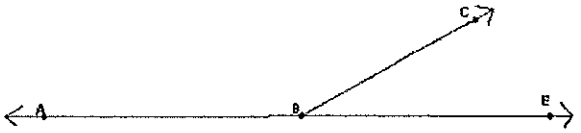
9. Given: $\overrightarrow{BD}$ bisects $\angle ABC$; $m\angle ABD + m\angle C = 90°$

Prove: $\angle DBC$ and $\angle C$ are complementary



Statements	Reasons
1. $\overrightarrow{BD}$ bisects $\angle ABC$	1. Given
2. $\angle ABD \cong \angle DBC$	2. Defn. bisect
3. $m\angle ABD = m\angle DBC$	3. Defn. $\cong$
4. $m\angle ABD + m\angle C = 90$	4. Given
5. $m\angle DBC + m\angle C = 90°$	5. Substitution POE
6. $\angle DBC$ and $\angle C$ are complementary	6. Defn. complementary

10. Given: $m\angle ABC = 5y - 3$
$m\angle CBE = 2y + 1$



Prove: $y = 26$

Statements	Reasons
1. $m\angle ABC = 5y - 3$ $m\angle CBE = 2y + 1$	1. Given
2. $\angle ABC$ and $\angle CBE$ form a linear pair	2. Definition of Linear Pair (you get this from the picture)
3. $\angle ABC$ and $\angle CBE$ are supplementary	3. Lin. Pr. Post.
4. $m\angle ABC + m\angle CBE = 180$	4. Defn. supplementary
5. $5y - 3 + 2y + 1 = 180$	5. Substitution POE.
6. $7y - 2 = 180$	6. Simplify
7. $7y = 182$	7. Addition POE
8. $y = 26$	8. Division POE

* Good for you for checking ANSWERS!

Name ANSWERS Period ____ Date BONUS: ~~ORDER~~

Geometry Extra Practice with Chapter 2

Draw a triangle with a face at the top of your test for a bonus point!

1. A statement is considered a **definition** if the original conditional **AND** its converse are both true. If they are **BOTH** true, then you can write the statement as a biconditional which contains the phrase if and only if.

2. Use the following statement for questions the following questions:

   All cats are felines

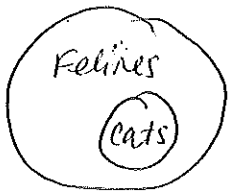
   a. Write this as a conditional
   If it is a cat, then it is a feline

   b. State the hypothesis it is a cat

   c. State the conclusion
   it is a feline

   d. Write the converse If it is a feline, then it is a cat.

Draw a Venn diagram for the above example.



3. Identify the hypothesis and conclusion of the conditional. Write the converse and state whether that is true or false… if it is false, state a counter example.

   If two angles are complementary, then their sum is 90°.

Hypothesis Two angles are complementary

Conclusion their sum is 90°

Converse If 2 angles have a sum = 90°, then they are complementary

Converse true or false True

Biconditional (only if true!) Two angles are complementary if and only if their sum is 90°

Counterexample (only if false!) ✓

4. Given the statement: ***All adjacent angles form a linear pair.*** Is the statement true or false? Explain.

   False some adj. angles do not form a straight ∠. 1/2 ∠1 adjacent to ∠2 and NOT a linear.

5. Re-write the following statement as a **conditional and converse.** Give the truth value of each statement, if it is false, give a counterexample.

Two angles that are adjacent share a common vertex.

Conditional: If 2 ∡'s are adjacent, then they share a common vertex

Converse: If 2 ∡'s share a common vertex, then they are adjacent

6. Use the following statement to answer the following: ***Vertical angles are angles that share a common vertex.***

a. Re-write the statement as a **conditional** and **converse.**

Conditional: If 2 ∡'s are vertical, then the share a common vertex

Converse: If 2 ∡'s share a common vertex, then they are vertical ∡'s

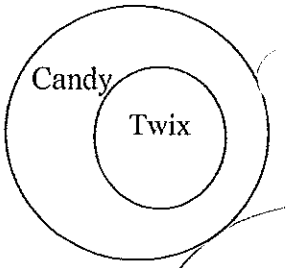
b. Is the statement a good definition? Yes or no? Why? If yes, write it as a biconditional.

false b/c NOT reversible

Then converse is FALSE.

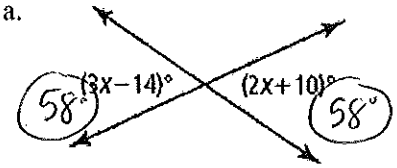
7. Write the **conditional statement** represented by the given diagram:

If it is a Twix, then it is candy.



8. ***Find the value of 'x', then the value of each of the labeled angles.***

a.



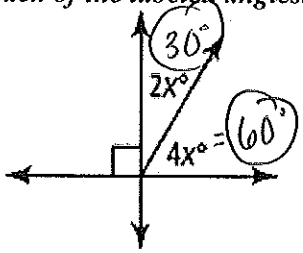
$3x - 14 = 2x + 10$

$x - 14 = 10$

$x = 24$

$3(24) - 14 = 58°$

b.

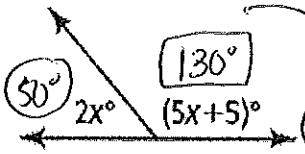


$2x + 4x = 90$

$6x = 90$

$x = 15$

c.



$2x + 5x + 5 = 180$

$7x + 5 = 180$

$7x = 175$

$x = 25$

* Remember the test will have a factoring problem on it!

9. ***Name the property of equality or congruence that justifies going from the first statement to the second statement.***

a. $\angle M \cong \angle N$
$\angle N \cong \angle M$

Symmetric Property of Congruence

b. $3x = 24$
$x = 8$

Division Prop. of Equ.

c. $\overline{PQ} \cong \overline{RS}$ and $\overline{RS} \cong \overline{TU}$
$\overline{PQ} \cong \overline{TU}$

Transitive Prop. of Congruence.

* Factor to solve: $x^2 = 2x + 3$