Name ANSWERS Period Date

Geometry 22: Extra Practice with Chapter 2

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 the following questions: ***All cats chase mice.***

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

b. State the hypothesis it is a cat

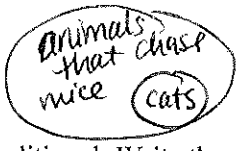
c. State the conclusion
it chases mice

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

e. Write the inverse If it is not a cat, then it does not chase mice,

f. Write the contrapositive
If it does not chase mice, then it is not a cat.

g. 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 2 angles are complementary

Conclusion their sum is 90°

Converse If 2 ∠'s have a sum of 90°, then they are complem.

Converse true or false true

Counterexample (only if false!) _____

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

False counterexample

∠1 ; ∠2 are adjacent, but not a linear pair

5. Re-write the following statement as a **conditional, converse, inverse** and **contrapositive.** 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

Inverse: If 2 ∢'s are NOT adjacent, then they do NOT share a vertex

Contrapositive: If 2 ∢'s do not share a common vertex, then they are not adjacent

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

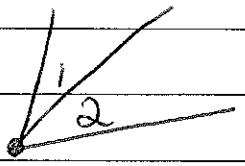
a. Re-write the statement as a **conditional** and **converse.**

Conditional: If 2 ∢'s are vertical ∢'s, then they share a common vertex

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

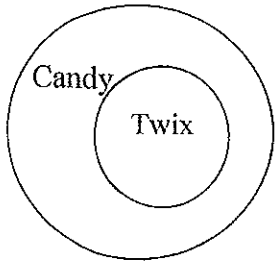
b. Is the statement a good definition? Yes or no? Why? If yes, write it as a biconditional.

No, converse is false



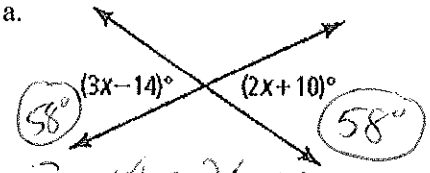
7. Write the **conditional statement** represented by the given diagram:

If it is a twix bar, then it is candy



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

a.

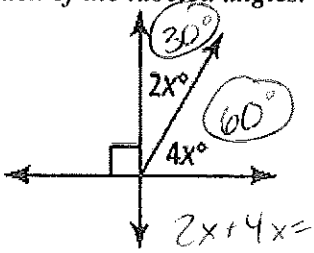


$3x - 14 = 2x + 10$

$-2x \quad -14 \quad -2x \quad -14$

$x = 24$

b.

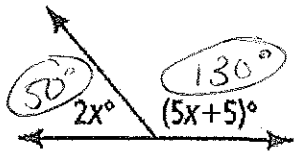


$2x + 4x = 90$

$6x = 90$

$x = 15$

c.



$2x + 5x + 5 = 180$

$7x + 5 = 180$

$7x = 175$

$x = 25$

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

b. $3x = 24$

$x = 8$

Division

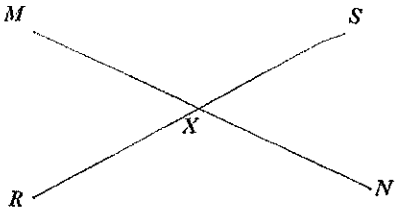
c. $\overline{PQ} \cong \overline{RS}$ and $\overline{RS} \cong \overline{TU}$

$\overline{PQ} \cong \overline{TU}$

Transitive

REMEMBER TO STUDY ALL THE PROOFS THAT HAVE BEEN DONE THROUGHOUT THE PAST COUPLE WEEKS!!!!

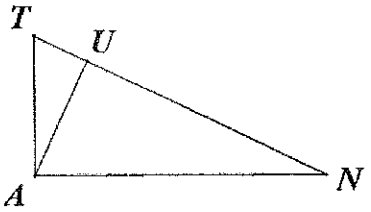
10. Complete the following fill-in proofs.



A. **Given:** X is the midpoint of $\overline{MN}$; $MX = RX$

Prove: $RX = XN$

STATEMENTS	REASONS
1) X is the midpoint of $\overline{MN}$	1) Given
2) $\overline{XN} \cong \overline{MX}$	2) Defn. midpt.
3) $XN = MX$	3) Defn. $\cong$
4) $MX = RX$	4) given
5) $XN = RX$	5) Substitution
6) $RX = XN$	6) Symmetric



B. **Given:** $\angle 1$ and $\angle 2$ are complementary; $m\angle 2 = m\angle 3$

Prove: $\angle 1$ and $\angle 3$ are complementary

STATEMENTS	REASONS
1) $\angle 1$ and $\angle 2$ are complementary	1) Given
2) $m\angle 1 + m\angle 2 = 90$	2) Definition of complementary angles
3) $m\angle 2 = m\angle 3$	3) Given
4) $m\angle 1 + m\angle 3 = 90$	4) substitution POE
5) $\angle 1$ and $\angle 3$ are complem.	5) Defn. complem.

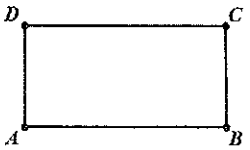
C. **Given:** $3(x + 1) = 2x + 7$

Prove: $x = 4$

STATEMENTS	REASONS
1) $3(x + 1) = 2x + 7$	1) Given
2) $3x + 3 = 2x + 7$	2) Distrib.
3) $x + 3 = 7$	3) Subtraction
4) $x = 4$	4) Subtraction

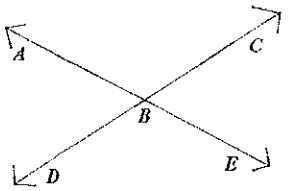
D. **Given:** $\angle A$ is a right angle; $\angle B$ is a right angle; $\angle B \cong \angle C$

Prove: $\angle A \cong \angle C$



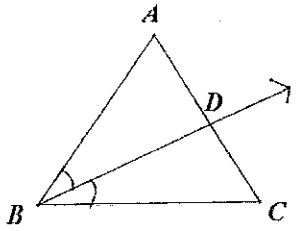
STATEMENTS	REASONS
1) $\angle A$ is a right angle; $\angle B$ is a right angle	1) Given
2) $\angle A \cong \angle B$	2) all right angles are congruent
3) $\angle B \cong \angle C$	3) given
4) $\angle A \cong \angle C$	4) transitive

E. **Given:** $m\angle ABC = 2x - 3$; $m\angle EBD = 85$
Prove: $x = 44$



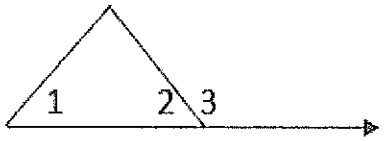
STATEMENTS	REASONS
1) $m\angle ABC = 2x-3$; $m\angle EBD = 85$	1) Given
2) $\angle ABC$ and $\angle DBE$ are vert $\angle$'s	2) definition of vertical angles
3) $\angle ABC \cong \angle DBE$	3) Vertical $\angle$'s Thm
4) $m\angle ABC = m\angle DBE$	4) definition of congruent
5) $2x - 3 = 85$	5) Substitution
6) $2x = 88$	6) Addition
7) $x = 44$	7) Division

F. **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) Definition of congruence
4) $m\angle ABD + m\angle C = 90$	4) Given
5) $m\angle DBC + m\angle C = 90$	5) Substitution
6) $\angle DBC$ & $\angle C$ are Complem	6) Defn. complementary

G. **Given:** $m\angle 1 + m\angle 3 = 180$
Prove: $\angle 1 \cong \angle 2$



STATEMENTS	REASONS
1) $m\angle 1 + m\angle 3 = 180$	1) Given
2) $\angle 2$ and $\angle 3$ form a linear pair	2) Defn. Lin. Pr.
3) $\angle 2$ & $\angle 3$ are supplem.	3) Lin. Pr. Postulate
4) $m\angle 2 + m\angle 3 = 180$	4) Defn. supplem.
5) $m\angle 1 + m\angle 3 = m\angle 2 + m\angle 3$	5) Substitution (or transitive)
6) $m\angle 1 = m\angle 2$	6) Subtraction Property of Equaliy
7) $\angle 1 \cong \angle 2$	7) Defn. $\cong$