Name: Key Date: Period:

HW #2-11

Complete the following questions. Do not submit online. Check answers on the classroom website.

1. **VOCAB:** Write the definitions for each of the following terms (will be a matching term with def on test):
   a. **Conjecture:** An unproved statement that is based on observations
   b. **Inductive Reasoning:** A process that includes looking for patterns and making conjectures
   c. **Deductive Reasoning:** A process that uses facts, definitions, accepted properties, and the laws of logic to form a logical argument.
   d. **Hypothesis:** The "if" part of a conditional statement written in the "if-then" form
   e. **Conclusion:** The "then" part of a conditional statement written in "if-then" form
   f. **Conditional Statement:** A logical statement that has a hypothesis and a conclusion
   g. **Biconditional Statement:** A statement that contains the phrase "if and only if"
   h. **Counterexample:** A specific case for which a conjecture is false
   i. **Postulate:** A rule that is accepted without proof
   j. **Theorem:** A statement that can be proven

2. Write the converse, inverse, and contrapositive of the following statement.

   Conditional: "If you are not an only child, then you have a sibling."

   Converse: If you have a sibling, then you are not an only child

   Inverse: If you are an only child, then you do not have a sibling

   Contrapositive: If you do not have a sibling, then you are an only child.

3. Write the converse, inverse, and contrapositive of the following statement.

   Conditional: "If it is Valentine's Day, then it is February."

   Converse: If it is February, then it is Valentine's Day.

   Inverse: If it is not Valentine's Day, then it is not February.

   Contrapositive: If it is not February, then it is not Valentine's Day.

4. Review #2 and #3. *Only one of them can be written as a biconditional statement.* Why? Briefly explain, then write the biconditional for that statement.

   #2 can be written as a biconditional statement because the conditional and converse are both TRUE.

   Biconditional: You are not an only child if and only if you have a sibling.

5. Which two statements are always logically equivalent?

conditional and contrapositive

converse and inverse

6. Determine if each conditional is true. If not, provide a counterexample.

a. If two angles are adjacent, then they have a common ray.

true!

b. If you multiply two irrational numbers, the product is irrational.

$\underbrace{\sqrt{5}\cdot\sqrt{5}}_{\text{both irrational}} = \sqrt{25} = 5$

rational (not irrational)

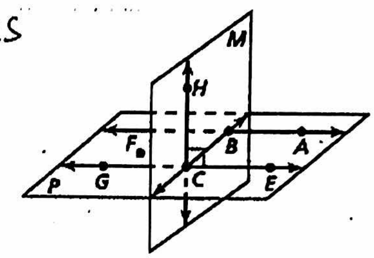
7. Use the diagram at the right to determine whether you can assume the statement. (diagram on pg. 117 of your textbook, #9-12, if this looks like a "black blob" when it goes through printing ☺)

a. Points A, B, C, and E are colplanar yes

b. Points F, B, and G are collinear NO

c. $\overleftrightarrow{HC} \perp \overleftrightarrow{GE}$ yes

d. $\overleftrightarrow{AB} \parallel \overleftrightarrow{GE}$ NO



8. Solve the equation. Justify each step.

$5x + 2(2x - 23) = -154$

$5x + 2(2x - 23) = -154$	given equation
$5x + 4x - 46 = -154$	distributive prop.
$9x - 46 = -154$	simplify
$9x = -108$	addition prop. =
$x = -12$	division prop. =

9. Name the property that the statement illustrates.

a. IF LM = RS and RS = 25, then LM = 25 transitive prop. = (or substitution prop. =)

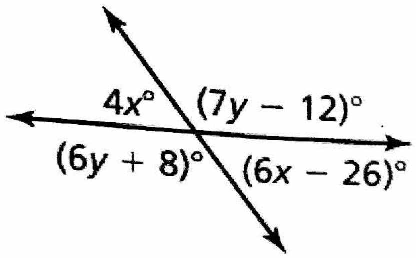
b. AM = AM reflexive prop. =

c. If $\angle DEF \cong \angle JKL$, then $\angle JKL \cong \angle DEF$ symmetric prop. $\cong$

d. $\angle C \cong \angle C$ reflexive prop. $\cong$

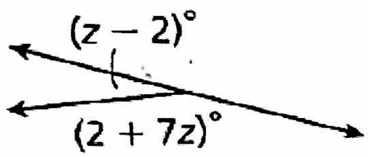
e. MN = NM reflexive prop. =

. Find the values of x and y.



x = 13
y = 20

11. Find the value of the variable. **z = 22.5**



12. Determine the conclusion you can make using the Law of Detachment, if possible. If not possible, briefly explain why.

If it is colder than 50°F, Tom wears a sweater. It is 46°F today.

Tom will wear a sweater

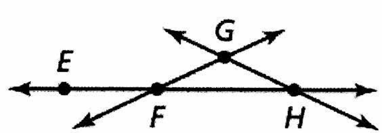
13. Determine the conclusion you can make using the Law of Syllogism, if possible. If not possible, briefly explain why.

If a figure is a square, then it is a quadrilateral. If a figure is a quadrilateral, then it is a polygon.

If a figure is a square, then it is a polygon.

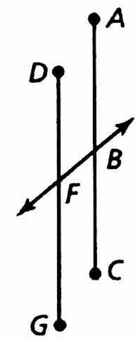
14. Write a two-column proof (on the test you will either write the statement given the reason or write a reason given the statement, but for now challenge yourself and write the entire proof! ☺)

Given: $\angle GFH \cong \angle GHF$
Prove: $\angle EFG$ and $\angle GHF$ are supplementary



Statements	**Reasons**
1. $\angle GFH \cong \angle GHF$	1. Given
2. $m\angle EFG + m\angle GFH = 180°$	2. linear pair → supp
3. $m\angle GFH = m\angle GHF$	3. $= \leftrightarrow \cong$
4. $m\angle EFG + m\angle GHF = 180°$	4. substitution prop. =
5. $\angle EFG$ and $\angle GHF$ are supplementary	5. definition of supp angles

15. Write a two-column proof (on the test you will either write the statement given the reason or write a reason given the statement, but for now challenge yourself and write the entire proof! ☺)



Given: $\overline{AB} \cong \overline{FG}$

$\overleftrightarrow{BF}$ bisects $\overline{AC}$ and $\overline{DG}$

Prove: $\overline{BC} \cong \overline{DF}$

Statements	**Reasons**
1. $\overline{AB} \cong \overline{FG}$ $\overleftrightarrow{BF}$ bisects $\overline{AC}$ and $\overline{DG}$	1. Given
2. $\overline{AB} \cong \overline{BC}$	2. def. of a segment bisector ($\overleftrightarrow{BF}$ bisects $\overline{AC}$)
3. $\overline{FG} \cong \overline{BC}$	3. Trans. Prop. $\cong$ (steps 1 and 2)
4. $\overline{DF} \cong \overline{FG}$	4. def. of a segment bisector ($\overleftrightarrow{BF}$ bisects $\overline{DG}$)
5. $\overline{BC} \cong \overline{DF}$	5. Trans. Prop. $\cong$ (steps 3 and 4)