

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.

$$\sqrt{5} \cdot \sqrt{5} = \sqrt{25} = 5$$

both irrational

rational (not irrational)

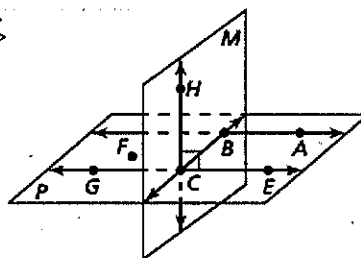
7. Use the diagram at the right to determine whether you can assume the statement. (diagram on pg. 117 of your textbook, #9-12, if this looks like a "black blob" when it goes through printing ☺)

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

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

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

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



8. Solve the equation. Justify each step.

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

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

$$5x + 4x - 46 = -154$$

$$9x - 46 = -154$$

$$9x = -108$$

$$x = -12$$

given equation
 distributive prop.
 simplify
 addition prop. =
 division prop. =

9. Name the property that the statement illustrates.

a. IF $LM = RS$ and $RS = 25$, then $LM = 25$ transitive

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. =

(or substitution prop. =)
 prop. =

10. The formula to convert a temperature in degrees Fahrenheit ($^{\circ}\text{F}$) to degrees Celsius ($^{\circ}\text{C}$) is $C = \frac{5}{9}(F - 32)$.

a. Solve the formula for F.

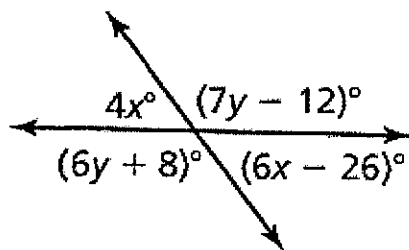
$$F = \frac{9C}{5} + 32$$

b. Using the formula from (a), convert 20°C to degrees Fahrenheit.

$$F = 68$$

$$\boxed{68^{\circ}\text{F}}$$

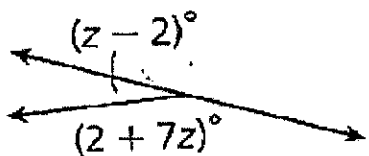
11. Find the values of x and y.



$$x = 13$$

$$y = 20$$

12. Find the value of the variable.



$$z = 22.5$$

13. 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.

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

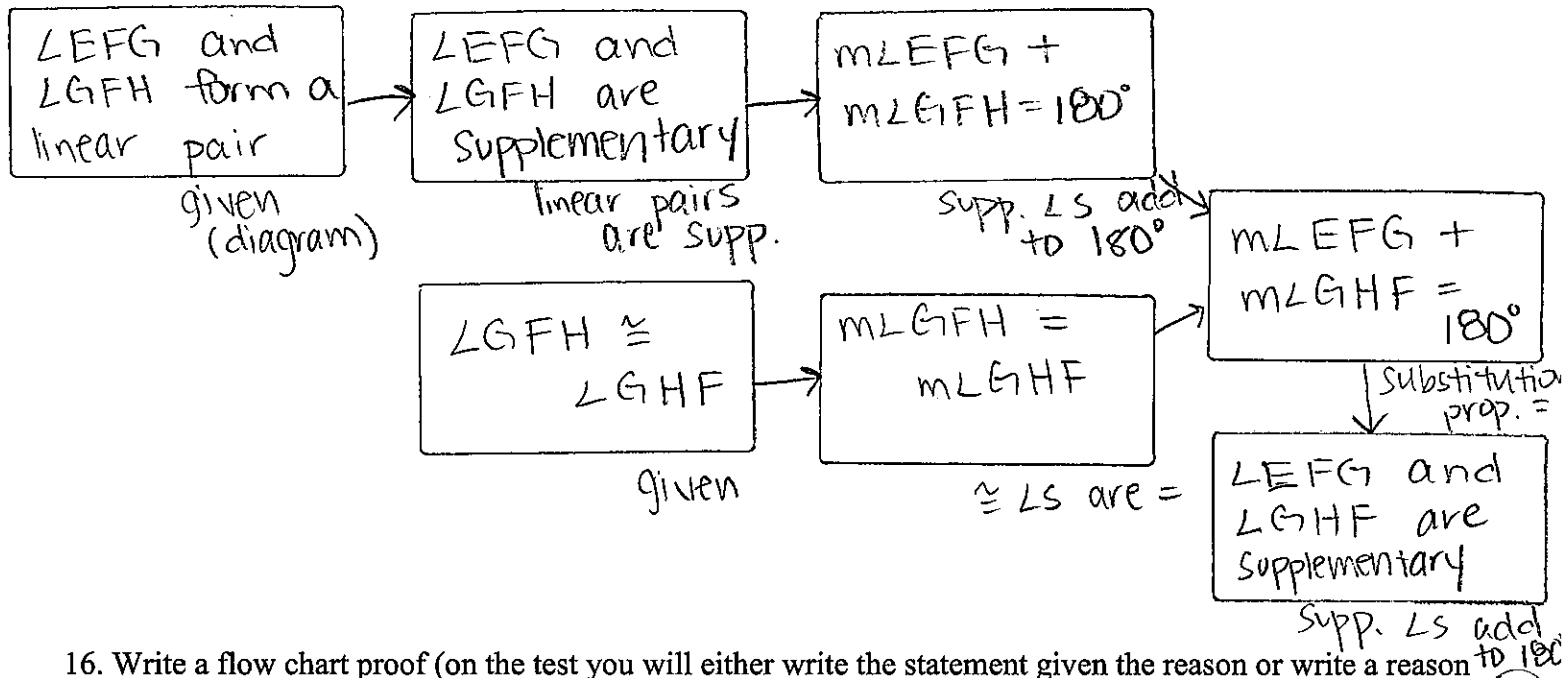
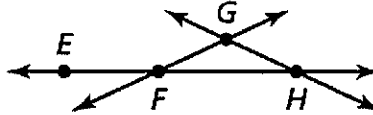
If a figure is a square, then it is a quadrilateral. If a figure is a quadrilateral, then it is a polygon.

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

15. Write a flow chart 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



16. Write a flow chart 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: $\overline{AB} \cong \overline{FG}$

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

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

