

You will need to write your answers on a separate sheet of paper.

1) Define the following words:

Biconditional statement

Conclusion

Conditional Statement

Conjecture

Contrapositive

Converse

Counterexample

Deductive Reasoning

Hypothesis

Inductive Reasoning

Inverse

Negation

2) Make a conjecture of each pattern. Then, write the next two items: , ...

3) The sum of an even number and an odd number is _____.

Determine if each conjecture is true. If not, write a counterexample.4) If C is the midpoint of \overline{AB} , then $\overline{AC} \cong \overline{BC}$ 5) If $2x + 3 = 15$, then $x = 6$

6) There are 28 days in February.

Identify whether each statement is inductive or deductive reasoning.

7) The United States Census Bureau collects data on the earnings of American citizens. Using data for the three years from 2001 to 2003, the bureau concluded that the national average income for a four-person family was \$43,527.

8) A sign in the cafeteria says that a car wash is being held on the last Saturday of May. Tomorrow is the last Saturday of May, so Justin concludes that the car wash is tomorrow.

9) Marcus learns in Social Studies that a presidential election happens every four years. He knows that the last presidential election was in 2004, so he concludes that the next presidential election will be in 2008.

10) At KPHS, students must take Biology before they take Chemistry. Sam is in Chemistry, so Marcia concludes that he has taken Biology.

Determine the converse, inverse, and contrapositive statement of each conditional statement. Then, determine the validity of each statement.11) If $\angle X$ is a right angle, then $m\angle X = 90^\circ$ 12) If x is a whole number, then $x = 2$.**Use the information to determine whether the statements below are true or false.**

13) Sue is a member of the swim team. When the team practices, Sue swims. The team begins practice when the pool opens. The pool opens at 8 a.m. on weekdays and 12 noon on Saturdays.

a) The swim team practices on weekdays only.

b) Sue swims on Saturdays.

c) Swim team practices start at the same time every day.

Write a biconditional statement if the statement is valid. If the statement is invalid, provide a counterexample.14) If $x < 0$, then the value of x^4 is positive.15) If the measure of one angle of a triangle is 90° , then the triangle is a right angle.**Complete the conjecture.**

16) If you are a clown, then you wear big shoes. If you wear big shoes, then your feet hurt.

Conjecture: If you are a clown, then _____.

Is the Law of Detachment or Law of Syllogism?

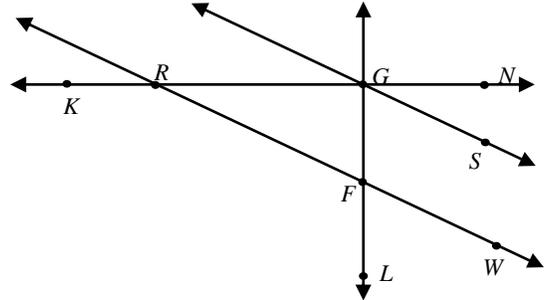
17) If a person sees penguins, then the person is in Antarctica. Carlos sees penguins.

Conjecture: If Carlos sees penguins, then _____.

Is the Law of Detachment or Law of Syllogism?

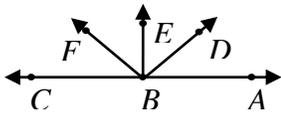
Based on the picture alone, determine if each statement is true or false.

- _____ 18) $\overline{KN} \perp \overline{LG}$
- _____ 19) $\angle LFR$ and $\angle GFR$ are a linear pair.
- _____ 20) F is the midpoint of \overline{GL}
- _____ 21) $\angle SGN$ and $\angle FGS$ are complementary.
- _____ 22) $\overline{GS} \parallel \overline{RW}$
- _____ 23) $\angle RGF$ and $\angle FGS$ are adjacent.
- _____ 24) F and S are collinear.



25) **Given:** $m\angle ABE = m\angle CBE$

Prove: $\angle ABD$ and $\angle DBE$ are complementary



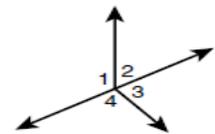
Statement	Reason
1. $m\angle ABE = m\angle CBE$	
2. $\angle ABE$ & $\angle CBE$ are a linear pair	Picture
3.	Linear Pair Theorem
4. $m\angle ABE + m\angle CBE = 180^\circ$	
5.	Substitution from step 1 into step 4
6. $2(m\angle ABE) = 180^\circ$	Simplify
7.	Division Property of Equality
8. $m\angle ABD + m\angle DBE = m\angle ABE$	
9. $m\angle ABD + m\angle DBE = 90^\circ$	
10.	

Write a proof based on the given plan.

26) **Given:** $\angle 1$ and $\angle 2$ form a linear pair, and $\angle 3$ and $\angle 4$ form a linear pair.

Prove: $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 = 360^\circ$

Plan: The Linear Pair Theorem shows that $\angle 1$ and $\angle 2$ are supplementary and $\angle 3$ and $\angle 4$ are supplementary. The definition of supplementary says that $m\angle 1 + m\angle 2 = 180^\circ$ and $m\angle 3 + m\angle 4 = 180^\circ$. Use the Addition Property of Equality to make the conclusion.



27) **Given:** $m\angle 1 = 90^\circ$

Prove: $m\angle 2 = 90^\circ$

