Geometry Notes Section 2-3 Sept 30

Using Deductive Reasoning to Verify Conjectures

With inductive reasoning, you use examples to make a conjecture. With **deductive reasoning,** you use facts, definitions, and properties to draw conclusions and prove that conjectures are true.

Tell whether each conclusion uses inductive or deductive reasoning.

1. So far, at the beginning of every Spanish class, the teacher has had students review vocabulary. Spanish class is about to start, and Eddie assumes that they will first review vocabulary.

   inductive

2. Opposite rays are two rays that have a common endpoint and form a line. $\overrightarrow{YX}$ and $\overrightarrow{YZ}$ are opposite rays.

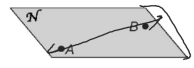
   deductive

Law of Detachment: If $p \rightarrow q$ is a true statement, and p is true, then q is true. (if p, then q) hypothesis conclusion

Given: If two points lie in a plane, then the line containing those points also lies in the plane. T

A and B lie in plane N. p

Conjecture: $\overleftrightarrow{AB}$ lies in plane N. q



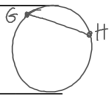
Make a conjecture if possible, using the Law of Detachment.

3. Given: If you ride the Titan roller coaster in Arlington, Texas, then you will drop 255 feet. T
   Michael rode the Titan roller coaster.

   Conjecture: Michael will drop 255 feet.

4. Given: A segment that is a diameter of a circle has endpoints on the circle.
   $\overline{GH}$ has endpoints on a circle.

   Conjecture: none



Tell whether the conjecture is valid or not valid, based on the Law of Detachment.

5. Given: If a figure is a square, then it has four equal sides. T
   Figure $ABCD$ has four equal sides.

   Conjecture: Figure $ABCD$ is a square. not valid

Another valid form of deductive reasoning is the **Law of Syllogism.** It is similar to the Transitive Property of Equality.

Transitive Property of Equality	**Law of Syllogism** **If $p \rightarrow q$ and $q \rightarrow r$ are both true, then $p \rightarrow r$ is true.**
If $y = 10x$ and $10x = 20$, then $y = 20$.	**Given:** If you have a horse, then you have to feed it. If you have to feed a horse, then you have to get up early every morning. **Conjecture:** If you have a horse, then you have to get up early every morning.

Make a conjecture if possible, using the Law of Syllogism.

6. Given: If $\angle K$ is obtuse, then it does not have a measure of 90°. If an angle does not have a measure of 90°, then it is not a right angle.

   Conjecture: If $\angle K$ is obtuse, then it is not a right angle.

7. Given: If two segments are congruent, then they have the same measure. If two segments each have a measure of 6.5 centimeters, then they are congruent.

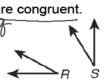
   Conjecture: none

Draw a conclusion if possible from the given information.

8. If $\triangle LMN$ is translated in the coordinate plane, then it has the same size and shape as its preimage. If an image and preimage have the same size and shape, then the figures have equal perimeters. $\triangle LMN$ is translated in the coordinate plane.

$\triangle LMN$'s image has same perimeter as $\triangle LMN$.

9. If $\angle R$ and $\angle S$ are complementary to the same angle, then the two angles are congruent. If two angles are congruent, then they are supplementary to the same angle. $\angle R$ and $\angle S$ are complementary to the same angle.



$\angle R$ & $\angle S$ are supplementary to the same angle.