Geometry
Unit: Introduction to Proofs
Section: Reasoning in Geometry

Review Worksheet

1. Define the following and give an example:

a. Inductive Reasoning:
Inductive Reasoning is a way of drawing general conclusions based on specific cases by examining their similarities. An example would be if you knew that Jim, John and Jeff were all boys in the Smith family, you might conclude that all boys in the Smith family have names that start with 'J'.

b. Conjecture:
This is a conclusion found using inductive reasoning. In the above example, the conjecture is that all boys in the Smith family have names that start with 'J'.

c. Deductive Reasoning:
This is the process of taking a general statement or definition and applying it to a specific case. "All 90 degree angles are called right angels. Angle A measures 90 degrees; therefore we can conclude that angle A is called a right angle."

d. Conditional Statement:
A statement that includes a hypothesis and a conclusion. "If I don't do my homework, then I will not get a good grade."

e. The Law of Detachment
The law of detachment states that if p and p→q are true statements, and p is true, then q is also true. "If two angles are complimentary then their measures add up to 90 degrees. Angle A and angle B are complimentary. Angle A and angle B's measures add up to 90 degrees."

f. The Law of Syllogism
The law of syllogism states that if p→q and q→r are true statements, then p→r is also a true statement. "If I work hard then my boss will give me a raise. If I get a raise then I will be able to save for a car quicker." The law of syllogism then allows us to make the statement "If I work hard then I will be able to save for a car quicker."

2. State a conjecture based on the following statements. What type of reasoning are you using? Write a counterexample to this conjecture.

- Jane is a girl that likes chocolate.
- Amy is a girl that likes chocolate.
- Laura is a girl that likes chocolate.
- Tammy is a girl that likes chocolate.

Based on the information given, we could make the conjecture that all girls like chocolate.

I used Inductive Reasoning to make this conjecture.
I might meet a girl named Sally who does not like chocolate. This would be a counterexample.

3. Name the following using the conditional statement given:

- If I study hard, then I will get good grades.

a. Hypothesis:
I study hard

b. Conclusion:
I will get good grades

c. Converse:
If I get good grades, then I study hard.

d. Inverse:
If I do not study hard, then I will not get good grades.

e. Contrapositive
If I do not get good grades, then I did not study hard.