

## Bellwork

### 09/08/2011

1. For the given statement, write the if-then form, the converse, the inverse, and the contrapositive.

**"Sophomores take driving lessons."**

If-Then: If you are a sophomore, then you take driving lessons.

Converse: If you take driving lessons, then you are a sophomore.

Inverse: If you are not a sophomore, the you don't take driving lessons.

Contrapositive: If you don't take driving lessons, then you are not a sophomore.

## Geometry

### 2.3 Apply Deductive Reasoning

#### Standard(s): 7,8

### Vocabulary:

**1. Deductive Reasoning:** Using facts, definitions, accepted properties, and the laws of logic to form a logical argument.

**2. Law of Syllogism (chain rule):** If part 1, then part 2. If part 2, then part 3. (Therefore) If part 1, then part 3.

Ex.     If I like protein, then I like meat. part 1  
           If I like meat, then I like eggs. part 2  
           If I like protein, then I like eggs. part 3

**3. Law of Detachment (direct argument):** If the hypothesis of a conditional statement is true, then the conclusion is also true.

Ex.     If two angles are supplementary, their sum is  $180^\circ$ .  
           A and C are supplementary.  
           So the sum of A and C is  $180^\circ$ .

Observing

Inductive Reasoning (patterns)	Deductive Reasoning (Facts)
Patterns	Facts
Converse	Direct Argument
Inverse	Chain Rule
Contrapositive	

**Remember:** A conditional statement is simply a statement that involves a hypothesis and a conclusion. Don't let it scare you!

**Remember:** A biconditional statement is an "if and only if" statement.

## Use the Law of Detachment

Use the Law of Detachment (Direct Argument) to make a valid conclusion in the true situation.

- A. If two angles are right angles, then they are congruent. C and D are right angles.

$\therefore \angle C + \angle D$  are  $\cong$ .

- B. If a student is enrolled at Metro High School, then he has an ID number. Nathan is enrolled at Metro High School.

$\therefore$  Nathan has an ID #.

## Use the Law of Syllogism

If possible, use the Law of Syllogism (chain rule) to write a new conditional statement that follows from the pair of true statements.

- A. If Joe takes <sup>part 1</sup> Geometry this year, then he will take <sup>part 2</sup> Algebra II next year. If Joe takes Algebra II next year, then he will graduate. <sup>part 3</sup>

If part 1, then part 3.  
 If Joe takes Geometry this year, then he will graduate.

- B. If the <sup>part 1</sup> radius of a circle is 4 ft, then the <sup>part 2</sup> diameter is 8 ft. If the radius of a circle is 4 ft, then its area is  $16\pi\text{ft}^2$ .

can't apply chain rule

- C. If  $y^3=8$ , then  $y=2$ . If  $y=2$ , then  $3y+4=10$ .

## Compare Inductive and Deductive Reasoning

Tell whether the statement is a result of inductive reasoning or deductive reasoning. Explain why.

**A. Whenever it rains in the morning, afternoon baseball games are canceled. The baseball game this afternoon was not canceled, so it did not rain this morning.**

Deductive. Direct Argument

**B. Every time Tom has eaten strawberries, he has a mild allergic reaction. The next time he eats strawberries, he will have a mild allergic reaction.**

Inductive. They made a prediction based on a pattern.

# Homework Assignment

## Worksheet 2.3B

