Name _____ Date _____ Period _____

SECTION 2.3 NOTES: Using Deductive Reasoning to Verify Conjectures

_____ uses logic to draw conclusions from given **facts,**

definitions, and **properties**.

Inductive Reasoning	vs	**Deductive Reasoning**

EXAMPLES: Is each conclusion a result of inductive or deductive reasoning?

1. There is a myth that you can balance an egg on its end only on the Spring Equinox. A person was able to balance an egg on July 8, September 21, and December 19. Therefore the myth is false.

_____.

2. There is a myth that the Great Wall of China is the only man-made object visible from the Moon. The Great Wall is barely visible in photographs taken 180 miles above the Earth. The Moon is about 237,000 miles from the Earth. Therefore, the myth cannot be true.

_____.

Law of Detachment

EXAMPLES: Determine if each conjecture is valid by the **Law of Detachment**.

1. <u>Given</u>: If two segments are congruent, then they have the same length.
   $\overline{AB} \cong \overline{XY}$
   <u>Conjecture:</u> $AB = XY$

_____.

2. <u>Given</u>: If you are tardy 3 times, you must go to detention.
   Jimmy is in detention.
   <u>Conjecture</u>: Jimmy was tardy at least 3 times.

_____.

Law of Syllogism

EXAMPLES: Determine if each conjecture is valid by the **Law of Syllogism**.

1. Given: If $m\angle A < 90°$, then $\angle A$ is acute. If $\angle A$ is acute, then it is not a right angle.
   Conjecture: If $m\angle A < 90°$, then it is not a right angle.

   _____.

2. Given: If a number is divisible by 4, then it is divisible by 2. If a number is even, then it is divisible by 2.
   Conjecture: If a number is divisible by 4, then it is even.

   _____.

MORE EXAMPLES:

1. Can we use the **Law of Detachment** to make the following conjectures? Why or why not?

   a) Given: If the side lengths of a triangle are 5cm, 12cm, and 13cm, then the area of the triangle is 30 cm^2. The area of $\Delta PQR = 30\ cm^2$.
      Conclusion: The side lengths of ΔPQR are 5cm, 12cm, and 13cm.

   b) Given: In the World Series, if a team wins 4 games, then the team wins the World Series. The Giants won 4 games in the 2012 World Series.
      Conclusion: The Giants won the World Series in 2012.

2. Is the conjecture valid by the **Law of Syllogism**? Why or why not?

   a) Given: If a figure is a kite, then it is a quadrilateral. If a figure is a quadrilateral, then it is a polygon.
      Conjecture: If a figure is a kite, then it is a polygon.

   b) Given: if a number is divisible by 2, then it is even. If a number is even, then it is an integer.
      Conjecture: If a number is an integer, then it is divisible by 2.

3. Draw a conclusion from the given information:

   a) Given: If the sum of the measures of two angles is 180°, then the angles are supplementary. If two angles are supplementary, they are not angles of a triangle. $m\angle A = 135°\ and\ m\angle B = 45°$.

   b) Given: If a polygon is a triangle, then it has 3 sides. If a polygon has three sides, then it is not a quadrilateral. Polygon *P* is a triangle.