Key

2.2-2.4 Warm Up: Write the converse, inverse, contrapositive, and biconditional of the following conditional statement. Then, give the truth value of each statement.

If a student is a Hinsdale Central Student, then their school mascot is not a Hornet. **TRue**

Converse: If a student's school mascot is not a Hornet, then he/she is a HC student.   True (False)

Inverse: If a student is NOT a HC student, then their school mascot is a Hornet.   True (False)

Contrapositive: If a student's school mascot is a Hornet, then he/she is not a HC student.   (True) False

Biconditional: A student is a HC student iff their school mascot in not a hornet.   True (False)

LAW OF SYLLOGISM (CHAIN OF REASONING)

- Allows you to draw conclusions from two conditionals statements when the conclusion of one is the hypothesis of the other.
- The connecting statement needs to be the <u>conclusion</u> of one statement and the <u>hypothesis</u> of the next.

$a \rightarrow b$	If an animal is a mammal, then it has hair. $m \rightarrow h$
$b \rightarrow c$	If the animal has hair, then it is a dog. $h \rightarrow d$
$c \rightarrow d$	
$\therefore \underline{a} \rightarrow \underline{d}$	If an animal is a mammal, then it is a dog. $m \rightarrow d$

1. If I go to football practice every day, then I will get stronger.
   If I get stronger, then I will be able to play in the game on Friday.
   If I get to play in the game on Friday, then I will score a touchdown.
   If I score a touchdown, then my team will win.

   What can you conclude? If I go to football practice every day, then my team will win.

Draw a conclusion from the given information using the Law of Syllogism.

1. If you clean your room, your parents will let you go to the party.
   If you go to the party, then you will meet the person of your dreams.
   If you meet the person of your dreams, you will have a date for homecoming!
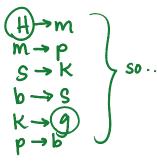
   What can you conclude? *If you clean your room, you will have a date for homecoming! ☺*

2. If I get all my homework done tonight, then my mom will let me go see a movie. [H → m]
   If I go see a movie tonight, then I'll want to buy some popcorn. [m → p]
   I spill my soda on the person in front of me, I'll get kicked out of the movie theater. [s → K]
   If I buy a soda, I'll spill it on the person sitting in front of me. [b → s]
   If I get kicked out of the movie theater, my mom will ground me. [K → g]
   If I buy some popcorn, I'll want to buy a soda, too. [p → b]

   What can you conclude?

   H → m
   m → p
   s → K   so…
   b → s
   K → g
   p → b

   H → m
   m → p
   p → b
   b → s
   s → K
   K → g

   If I get all my homework done tonight, my mom will ground me!? ☹

Determine if a conjecture is valid the Law of Syllogism.

3. Given: If a number is divisible by 2, then it is even. [d → e] If a number is even, then it is an integer. [e → i]

   Conjecture: If a number is an integer, then it is divisible by 2.

   → e } so d → i
   e → i

   Valid or (Invalid?) Correction if invalid __If a # is divisible by 2, then the # is an integer.__

4. Given: If $m\angle A < 90°$, then $\angle A$ is acute. [m → a] If $\angle A$ is acute, then it is not a right angle. [a → ~r]

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

   m → a } so m → ~r
   a → ~r

   (Valid) or Invalid? Correction if invalid _____