Name: _____

2.1– Geometric Reasoning

Past due on: _____ Period:_____

1. Does each conclusion use inductive or deductive reasoning?
   a. A detective learns that his main suspect was out of town the day of the crime. He concludes that the suspect is innocent.

   b. All of the students in Henry's Geometry class are sophomores. Alexa takes Geometry, but has another teacher. Henry concludes that Alexa is also a sophomore.

2. Determine whether inductive reasoning or deductive reasoning is used in the problem situation. Then determine whether the conclusion is correct AND explain your reasoning.
   Mike has been told that lightning never strikes twice in the same place. During a lightning storm, he sees a tree struck by lightning and goes to stand next to it, convinced that it is the safest place to be.

3. In the problem situation, identify whether each person is using inductive or deductive reasoning. Then compare and contrast the two types of reasoning.
   When Madison babysat for the Johnsons for the first time, she was there two hours and was paid $30. The next time she was there for five hours and was paid $75. She decided that the Johnsons were paying her $15 per hour. The third time she went, she stayed for four hours. She tells her friend Jennifer that she makes $15 per hour babysitting. So, Jennifer predicted that Madison made $60 for her four hour babysitting job.

4. Write each statement as a conditional.
   a. *You will be late to school if you miss the bus.*

   b. *I will go to the game if I get all of my homework done.*

   c. *A student on the high honor roll has at least a 90% average.*

5. Use the Law of Syllogism to draw a conclusion from the given information.
   If a team wins 10 games, then they play in the finals. If a team plays in the finals, then they travel to Boston. The Ravens won 10 games.

6. Find a counterexample for each statement.
   a. *All birds can fly.*

   b. *All bears are brown.*

7. Identify the <u>hypothesis</u> and <u>conclusion</u> of each conditional statement.
   a. *If two lines intersect at right angles, then the lines are perpendicular.*

   b. *If two lines are located in the same plane, then the lines are coplanar lines.*

8. Determine if the conditional statement is true. If it's false, give a counterexample.
   If an angle is obtuse, then it has a measure of 100°.

9. Consider the conditional statement: *If a figure is a square, then it has four sides.*
   a. Write the converse.

   b. Determine the truth value of the conditional.

   c. Determine the truth value of the converse.

   d. If both statements are true, write a biconditional.

10. Consider the conditional statement: *If you eat all of your vegetables, then you will grow.*
   a. Write the inverse:

   b. Write the contrapositive:

Assume that the following premises are true. Rearrange the premises to prove the theorem.

12. *Premise 1:* If taxes rise, then the people will be unhappy.
    Premise 2: If people are unhappy, then they will go to the polls.
    Premise 3: If the president gets his budget passed, then taxes will rise.
    Premise 4: If people go to the polls, the president will be voted out of office.
    Theorem: If the president gets his budget passed, then he will be voted out of office.

13. *Premise 1:* If the weather report is accurate, then we will get 12 inches of snow.
    Premise 2: If we get 12 inches of snow, then the streets will be treacherous.
    Premise 3: If the streets are treacherous, then school will be canceled.
    Theorem: If the weather report is accurate, then school will be canceled.

14. *Premise 1:* If I watch TV, then I will not do my homework.
    Premise 2: If I fail geology, then I will lose my scholarship.
    Premise 3: If I do not do my homework, then I will fail geology.
    Premise 4: If I lose my scholarship, then my parents will be upset.
    Theorem: If I watch TV, then my parents will be upset.

Assume that the following statements are true. Using the Law of Detachment and/or the Law of Syllogism, what valid conclusion can be reached?

15. If a triangle has one 90° angle, then the triangle is a right triangle. In $\triangle DEF$, $m\angle E = 90°$.

16. If a person is involved in politics, then that person will be in the public eye. If a person is in the public eye, then they appear in the newspaper and on television a lot.

17. If a student is on the soccer team, then that student has passing grades. Kali is on the soccer team.

18. If it does not rain, the cross country team will have practice.
    If the cross country team has practice, the team members will warm up by jogging two miles.
    It does not rain on Friday.