Conjectures and Counterexamples – #1

Name: ___________________________ Period: _____ Due Date: ______

1. Your math teacher has given your class a homework assignment every Monday for the last three weeks.
   a. Using inductive reasoning, what could you conclude?
   b. What counterexample would show that your conclusion is false?

2. Every time you ride the bus for the first two weeks of school you notice that the girls sit on the right side of the bus and the boys sit on the left side.
   a. Using inductive reasoning, what could you conclude?
   b. What counterexample would show that your conclusion is false?

3. Use the table and inductive reasoning. Make a conjecture about each value.
   a. The sum of the first 6 positive even numbers
      
      |   |   |
      | 2 = 2 = 1.2 |
      | 2 + 4 = 6 = 2.3 |
      | 2 + 4 + 6 = 12 = 3.4 |
      | 2 + 4 + 6 + 8 = 20 = 4.5 |
      | 2 + 4 + 6 + 8 + 10 = 30 = 5.6 |
   b. The sum of the first 30 positive even numbers
      
      |   |   |
      | 2 + 4 + 6 + 8 + 10 = 30 = 5.6 |
   c. the sum of the first 100 positive even numbers

4. Use inductive reasoning to fill in the blanks.
   a. 6 x 7 = 42
      66 x 67 = 4422
      666 x ____ = 444222
      6666 x 6667 = 44442222
      66666 x 66667 = __________
   b. 1 + (9 x 0) = 1
      2 + (9 x 1) = 11
      3 + (9 x 12) = 111
      4 + (9 x 123) = ________
      _________ = 11111
5. Find a counterexample to show that each conjecture is false.
   
   a. You can connect any three points to form a triangle.
   
   b. All four sided figures are squares.
   
   c. The sum of two numbers is greater than either number.
   
   d. The product of two positive numbers is greater than either number.

6. Decide whether each statement is true or false. If false, provide a counterexample.
   
   a. If it is a Saturday, then there is no school.
   
   b. If a number is prime, then it is an odd number.
   
   c. If \( -2x - 4 = 6 \), then \( x = -5 \).
   
   d. If I have 25 cents, then I have a quarter.
   
   e. If you can divide a number by 2, then you can divide the number by 4.
   
   f. If a student is a 9\(^{th}\) grader, then he is a freshman.