2-1 Inductive Reasoning and Conjecture

Inductive reasoning: reasoning that uses a number of specific examples to arrive at a ___conclusion___.

- You are applying inductive reasoning when you assume that an observed ___pattern___ will continue.
- A concluding statement reached using inductive reasoning is called a ___conjecture___.
- To show that a conjecture is true for all cases, you must prove it.
- It takes only ___one___ ___false___ example to show that a conjecture is not true.
- This false example is called a ___counter-example___.

☺ EXAMPLES FOR YOU TO PRACTICE:

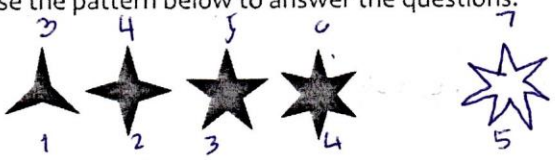**Observing the following patterns, answer each question.**

1. A dot pattern is shown below. How many dots would there be in the bottom row of the 4th figure? What would be the total number of dots in the 6th figure?

   1   2   3   4   10 +5 15 +6 (21)
   1 +2 +3   +4
      3   6
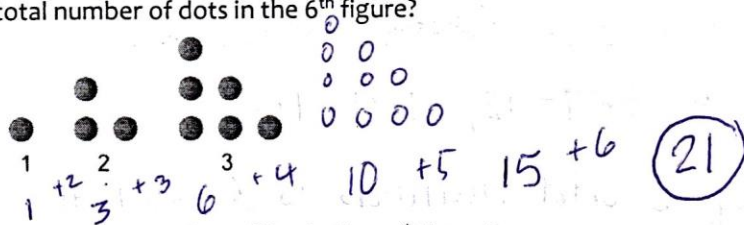
2. How many triangles will be in the 10th figure?

   4   6   8
   1   2   3   4 5 6 7 8 9 10   (22)
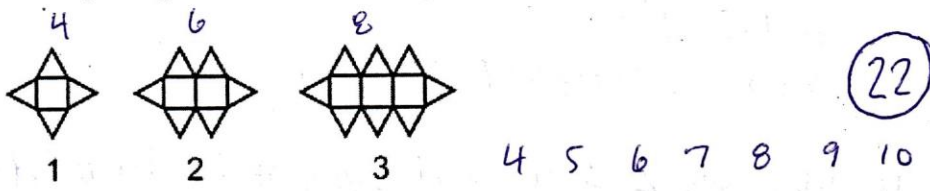
3. Use the pattern below to answer the questions.

   3   4   5   6   7
   1   2   3   4   5

   a. Draw the next figure in the pattern.
   b. How does the number of points in each star relate to the figure number? $\# + 2$
   c. Use part b to determine a formula for the *n*th figure. $n + 2$

Find a counterexample to show that each conjecture is false.

1. Given: John is taking notes in class.

   Conjecture: John is using a pencil.   John could be using a pen or a laptop.

2. Given: An animal is a bird.   It could be a wren,

   Conjecture: It must be an eagle.

3. If a number is a prime number, then it must be an odd number.   2 is a prime # but its not an odd #.