2.1 - Inductive Reasoning

Using specific information to make a plausible conclusion (conjecture) that may or may not be accurate.

Conjecture - An educated guess or prediction based only on information given.

Example:
Make a conjecture based on the given information (a drawing or a description).

1) Point P is the midpoint of NQ.
   a) \[\overline{NP} \cong \overline{PQ}\]
   b) \[\overline{NP} \cong \overline{PQ}\]
   c) \text{Point P BISECTS } \overline{NQ}. 
EX $\overline{AB} \cong \overline{CD}$

EX $\angle 3 \cong \angle 4$

EX $\angle 3$ and $\angle 4$ are vertical angles.
Ex: Make a conjecture about the type of number you get from the sum of an even number and an odd number.

**Examples:**

\[ 7 + 10 = 17 \]
\[ 2 + 3 = 5 \]
\[ 2094 + 7041 = 9115 \]
Inductive Reasoning

- Make a conjecture

- Prove a conjecture is true by showing it is true for every possible case.

- Prove a conjecture is false by finding a counterexample.

EX: Prove the following conjecture is false:
The sum of two integers is positive.

\[ 3 + 5 = 8 \]
\[ -3 + 5 = 2 \]
\[ 3 + (-5) = -2 \]
Ex: Make a conjecture about the next item in each sequence:

1) 1, 3, 5, 7, 9,...

2) 6, 3, 0, -3, -6, -9,...

3) \[
\frac{1}{3}, \frac{2}{6}, \frac{3}{12}, \frac{4}{24}, \frac{5}{48}, \frac{6}{96}, \ldots
\]

4) 1, 4, 9, 16, 25, 36,...

5) 1, 1, 2, 3, 5, 8, 13, 21, 34,...
Hailstone Sequence:
• Start with any integer.
• If it is even, divide by 2.
• If it is odd, multiply by 3 and add 1.
• Repeat...

• Try different starting numbers.
• Make a conjecture.