

1 Making Conjectures (1.1)

January 3, 2020 5:58 PM

FOM 11

Ch1: INDUCTIVE and DEDUCTIVE REASONING Page 1

Day 1: Making Conjectures: Inductive Reasoning (1.1)

Big Ideas: In the world around us, we look for **patterns**. We make **conjectures** about patterns. It is important to see all types of problems from different perspectives. We can use **inductive and deductive reasoning** to make assumptions and to validate an argument.

Pattern: a repeated order of objects or numbers. We can make predictions about what will come next in a pattern.

Conjecture:

an unproven conclusion ("hypothesis")
based on specific cases

Inductive reasoning:

drawing a conclusion
by observing patterns
+ identifying properties in
examples

To come up with a **conjecture**, look for patterns in specific examples:

Example 1: Make a conjecture about the product of two odd integers.

Try some examp's!

$$\begin{aligned}(1)(3) &= 3 \\ (1)(5) &= 5 \\ (7)(3) &= 21\end{aligned}$$

My conjecture:
The product of 2 odd #'s
is odd.

Example 2: Make a conjecture about the difference between **consecutive perfect squares**.

perfect squares:

$$\begin{array}{lcl} 1^2 = 1 & \rightarrow & 4 - 1 = 3 \\ 2^2 = 4 & \rightarrow & 9 - 4 = 5 \\ 3^2 = 9 & \rightarrow & 16 - 9 = 7 \\ 4^2 = 16 & \rightarrow & \end{array}$$

The difference
between
consec. perfect
squares is
increasing
odd #'s.

Example 3: Ms. Kamber is marking a quiz on inductive reasoning. She spilled chocolate milk on the quiz. A conjecture reads as follows:

“The sum of ^{→ add} three consecutive integers is always three times the...” Determine the missing portion using inductive reasoning.

$$\begin{aligned} 1 + 2 + 3 &= 6 \\ 4 + 5 + 6 &= 15 \\ 2 + 3 + 4 &= 9 \end{aligned}$$

↓
middle number

Example 4: What conjecture(s) can be made about the figures shown?

Figure 1



Figure 2

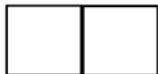


Figure 3

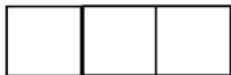


Figure 4

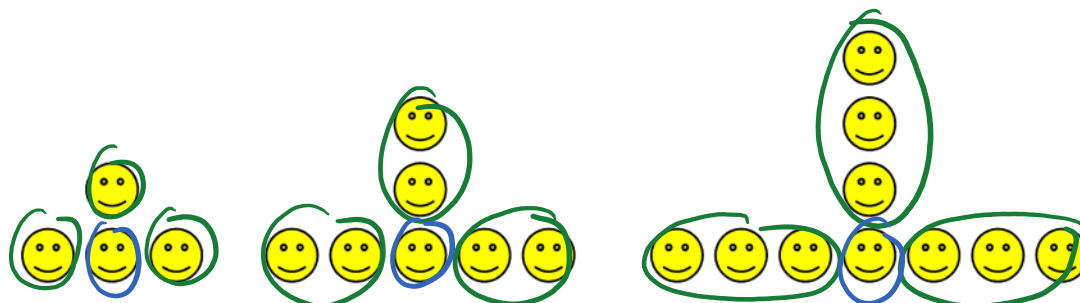


Figure 5

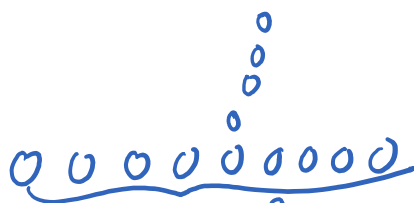


FIGURE NUMBER, f	NUMBER OF SIDES, n
1	
2	
3	
4	
5	
6	
20	

Example 5: Consider the following pattern of smiley faces.



- a) Draw the next (4th) figure in the pattern above. How many smiley faces will be in figure 10?



- b) Construct a table of results and make a conjecture relating the figure number and the number of smiley faces.

Figure number, f	Number of smiley faces, n
1	4
2	7
3	10
4	13
10	31

$$n = 3f + 1$$

- c) Use your conjecture to determine the number of smiley faces in Figure 58.

$$\begin{aligned}
 &= 3(58) + 1 \\
 &= \boxed{175}
 \end{aligned}$$

Assignment: Sec. 1.1, p. 12 #3, 8, 9, 11, 12, 13, 16.