1.1 Patterns & Inductive Reasoning – Notes Date: _____

Learning Targets	Help!	I'm getting there...	I'm almost there...	Yes! I totally got this! ☺
1. I can determine terms in a sequence based on a pattern.				
2. I can use inductive reasoning to make conjectures.				
3. I can provide a counterexample to show a conjecture is false.				

Warm-Up: Read this excerpt from a news article.

Top female runners have been improving about twice as quickly as the fastest men, a new study says. If this pattern continues, women may soon outrun men in competition!

The study is based on world records collected at 10-year intervals, starting in 1905 for men and in the 1920s for women. If the trend continues, the top female and male runners in races ranging from 200 m to 1500 m might attain the same speeds sometime between 2015 and 2055.

Women's marathon records date from 1955 but their rapid fall suggests that the women's record will equal that of men even more quickly, perhaps by 2005.

a. What conclusion was reached in the study?

b. Explain why the conclusion that women may soon be outrunning men may be incorrect.

**Inductive Reasoning: an observation based on a pattern.

Example A: Use inductive reasoning to find a pattern for each sequence. Find the next two terms in the sequence.

1) 4, 8, 16, 32, 64, 128 (×2)

2) 384, 192, 96, 48, 24, 12 (÷2)

3) O, T, T, F, F, S, S, E, N, T, E (one, two, three, four, five, six, seven, eight, nine)

4) 

**Conjecture: a statement based on an observed pattern.
* not always true!

Example B: Make a conjecture about the sum of the first 30 odd numbers.

Given:

Perfect Squares

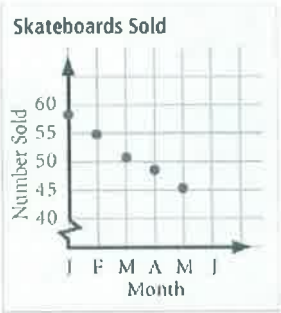
*		
1	1	$= 1$
2	$1 + 3$	$= 4$
3	$1 + 3 + 5$	$= 9$
4	$1 + 3 + 5 + 7$	$= 16$
5	$1 + 3 + 5 + 7 + 9$	$= 25$

$30^2 = 900$

Conjecture: The number of terms squared.

Example C: Real-World Connection

A skateboard shop finds that over a period of five consecutive months, sales of small-wheeled skateboards decreased. Use inductive reasoning to make a conjecture about the number of small wheeled skateboards the shop will sell in June.



About 40 skateboards

**Counterexample: an example that proves a conjecture to be false.

Example C: The first 3 odd prime numbers are: 3, 5, and 7

* Prime: only divisible by itself and one.

1) Make a conjecture about the 4th odd prime number.

9 is the 4th odd prime #.

2) Test your conjecture. Identify the counter example.

$9 \div 3 = 3$