

Objectives: You will be able to make conjectures based on inductive reasoning and be able to find counter examples.

Inductive Reasoning: A type of reasoning that uses a number of specific examples to arrive at a plausible prediction.



** Solving patterns requires inductive reasoning!!

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Example #1: Find a pattern for the sequence and use it to determine the next two terms.

a) 4, -8, 16, -32, 64, -128
-2, -2

b) 3, 4, 7, 11, 18, 29

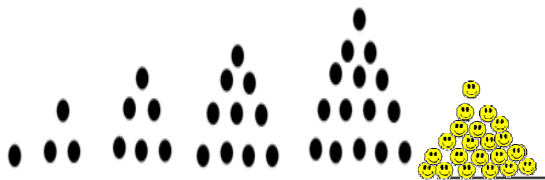
Fibonacci Sequence 1, 1, 2, 3, 5, ...

c) Friday, Wednesday, Monday,

Sat, Thurs

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d)



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Conjecture: An educated guess based on known information



If i only had a ~~briar~~ brain.

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Example #2:

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

1
 $1+3=4$
 $1+3+5=9$
 $1+3+5+7=16$

$1-1$
 $2-4$
 $3-9$
 $4-16$
 $5-25$
 $30^2 = 900$

What about the first 100 odd numbers?

$100^2 = 10,000$

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Example #3:

Points D, E, and F are collinear. Make a conjecture.

D, E, F are on the same line

$DE + EF = DF$

D, E, F are all on line r.



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Example #4:

$\angle 1$ & $\angle 2$ are complementary angles. Make a conjecture.

$m\angle 1 + m\angle 2 = 90^\circ$



$\angle 1$ & $\angle 2$ are adjacent

$\angle 1 \cong \angle 2$

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Example #5:

The first 3 odd prime numbers are 3, 5, and 7. Make and test a conjecture about the 4th prime number using the given information.

3, 5, 7, ~~9~~ 11

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** Not all conjectures are true !!

9, false c.e.: $3 \cdot 3 = 9$

Counter example: A particular example or instance of the statement that makes the conjecture false.

** You only need 1 counter example to prove a conjecture false!!

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Example #6: Determine the truth value of each conjecture. If false, provide a counter example.

a) If the animal has four legs, then it is a dog.

False c.e. rat
cow
pig

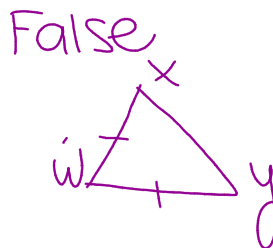
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b) The product of two numbers is always greater than both the numbers that are being multiplied.

False c.e. $1 \cdot 2 = 2$
 $-2 \cdot 3 = -6$ $2 > 1 \checkmark$
 $2 \not> 2$

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c) If WXY is an isosceles triangle, then $WX = XY$.



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Deductive Reasoning: Uses facts, definitions, and accepted properties to form a logical argument.



Example #7: Determine whether inductive or deductive reasoning is used to reach the conclusion.

a) Each time Monica ~~lets~~ goes to Starbucks, she orders a latte. So, the next time she goes to Starbucks, Monica will order a latte.

inductive

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b) All reptiles are cold-blooded. Parrots are not cold blooded. Sue's pet parrot is not a reptile.

deductive

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