

Natural or Counting Numbers

Ellipsis

Scientific Method

Hypothesis or Conjecture

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three dots indicating a continuation of the pattern Scientific Method

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the process for proving (or disproving) a hypothesis after observations of specific cases

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a specific example that proves that the conjecture is false

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Rules about counterexamples:

It takes only one to disprove a conjecture
Not finding one neither proves or
disproves a conjecture

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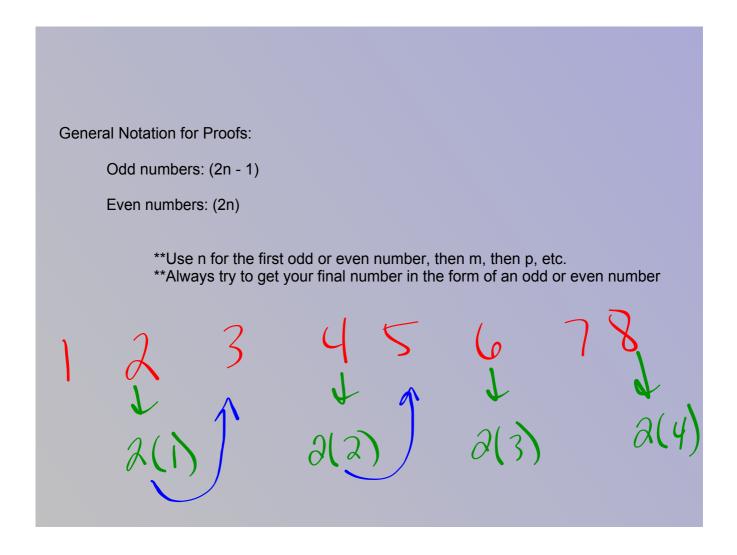
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The Process:

Observe a trend
Make a general conclusion based on the trend (IR)
Make a hypothesis to prove
Look for a counterexample
If you can't find a counterexample make a proof (DR)
If your proof holds up, then you have proven your hypothesis

When will you use inductive reasoning?	
When will you use deductive reasoning?	



Example 1: The product of two odd numbers Will the product of two odd numbers always be odd? Odd #1: 20 -Odd = 2:2m - 1 (2n-1)(2m-1) 4nm - 2n - 2m +1 2(something) = 1 2(2nm-n-m)+

Example 2: The sum of an odd and an even number

If an odd number and an even number are added, will the sum be an odd or an even number?

Example 3: Divisibility
If the last two digits of a number are divisible by seven will the number thenbe divisible by seven?

714

549

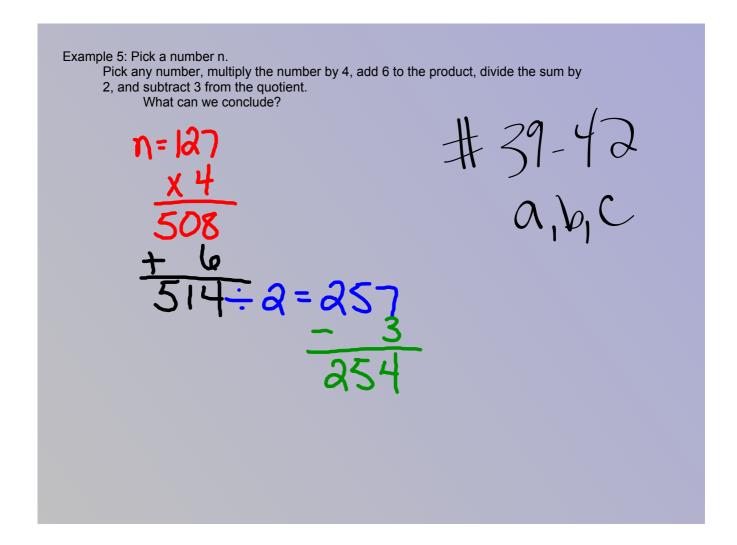
Example 4: Prove or Disprove

a) The difference of any two counting numbers will be a counting number.

(0-20=-10)

b) The product of any two counting numbers will be a counting number.

Yes



Example 6: Pick a number n.

Prove the conjecture from Example 5.

Pick any number, multiply the number by 4, add 6 to the product, divide the sum by 2, and subtract 3 from the quotient.

$$\frac{4x+6}{2} = 2x+3-3$$

$$= \sqrt{\chi} \sqrt{\chi}$$

IN YOUR HOMEWORK -

Pay close attention to #39 - 42!!!