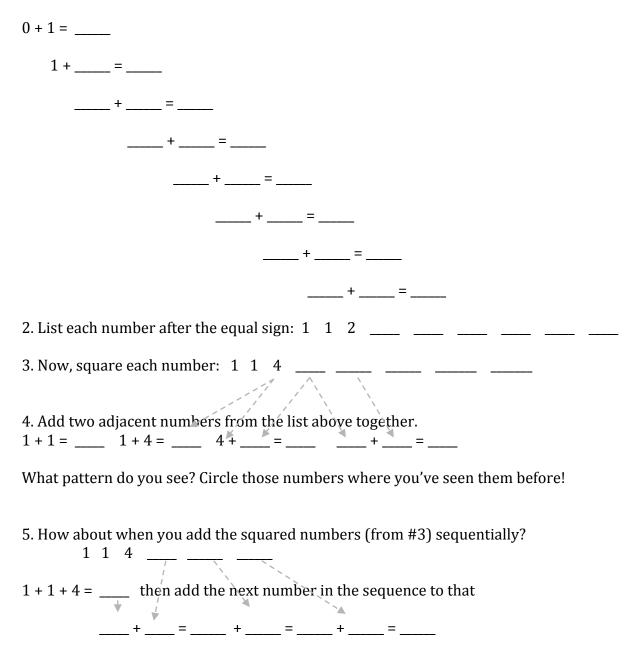


1. First, we're going to figure out the Fibonacci sequence. Fill out the blanks below:



6. List the numbers from above after each equal sign (=): _____ ____

7. How is each number listed in #6 expressed as a multiplication of numbers in the Fibonacci sequence, listed after #2?

your first number ____ = ___ x ____ your second number ____ = ___ x ____ your third number ____ = ___ x ____ your fourth number ____ = ___ x ____

Another fun and mind-blowing fact...

8. Going back to the original Fibonacci sequence, divide the larger number by the previous smaller number and let's see what we get. The original sequence (#2) is:

1 1 2 and so c	 Dn		
1 ÷ 1 = 2 ÷ 1 =	÷2 =	÷=	·÷=
÷=	÷=	÷=	÷=

9. Let's do some graphing to see more about how this works!

a. What is the first number of the Fibonacci sequence? _____ On the graph paper at the end of this handout, there is square that is 1 x 1.

b. What's the second number of the Fibonacci sequence? _____ Right above the square you just drew, draw another 1 x 1 square.

c. What's the second number in the Fibonacci sequence? _____ Directly to the left of the two existing squares, draw in a 2 x 2 square.

d. What's the next number in the Fibonacci sequence? _____ Right below your existing squares, draw a _____ x ____ square.

e. What's the next number in the Fibonacci sequence? _____ To the right of all that you've drawn, draw a _____ x ____ square.

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Golden ratio = 1.618033...

f. What's the next number in the Fibonacci sequence? _____ Above all that you've drawn, draw a _____ x ____ square.

g. What's the next number? _____ To the left of all that you've drawn, draw a _____ x ____ square.

h. What's the next number? _____ Below all that you've drawn, draw a _____ x ____ square.

... To the right of that would be the next square, but we've run out of room.

10. Now let's see how we can make a pattern out of these squares.

In the original square, draw a line from the bottom left to the top right.

On the next 1 x 1 square, continue that line across your square, from the bottom right to the top left.

Cross the 2 x 2 square from the top right to bottom left.

Cross the 3 x 3 square from the top left to bottom right.

Cross the 5 x 5 square from bottom left to top right.

Cross the 8 x 8 square from bottom right to top left.

Continue the line across the 13 x 13 square and the 21 x 21 square, wrapping up with a line that would go through the 34 x 34 square.

11. What pattern do you get?

12. Where do we find spirals naturally?

13. Count the number of things that make up a spiral on a pineapple or a pine cone or the number of petals on a flower or number of spirals on a froccoli or seeds of a sunflower.

They all occur in Fibonacci numbers! Nature is full of mathematical patterns! Amazing, huh? See what other cool patterns you can figure out in nature.

