Section 1.3 Fibonacci Sequence

In the late 12th century, a mathematician, Leonardo Fibonacci studied a sequence of numbers with a different rule for determining the next number in a sequence. This sequence is called the <u>**Fibonnaci Sequence**</u>.

$$\{1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, \ldots\}$$

Each term of the sequence is called a **Fibonacci number**.

What is the rule for this sequence?

To calculate the next term, find the sum of the previous two terms.

Pull

Question: The 19th Fibonacci number is 4181 and the 20th term is 6765.

a) What is the next Fibonacci number (ie the 21st term)?

MC

$$21^{st} \# = 19^{th} \# + 20th$$
$$= 4181 + 6765$$
$$= 10\ 946$$

b) What is the previous Fibonacci Number (ie. the 18th term)?

MC

$$18^{th} = 20^{th} - 19^{th}$$
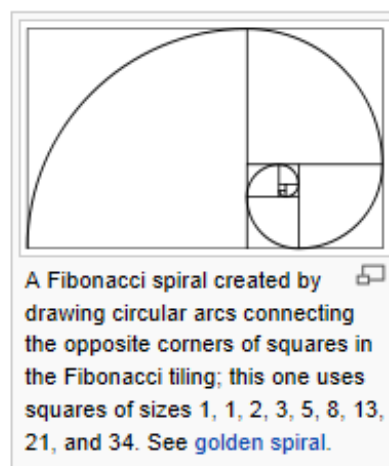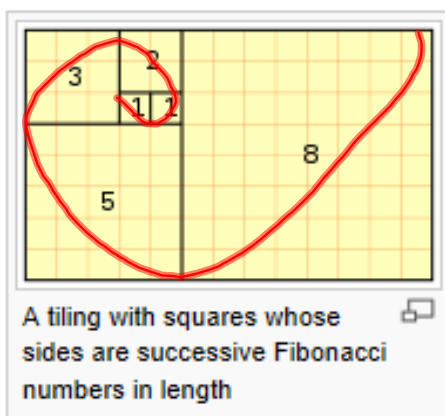$$18^{th} = 6765 - 4181$$
$$= 2584$$

Question:　How would you calculate the 50th Fibonacci number?

You can only find the 50th Fibonacci number by continuing to find the sum of the previous two terms. So you would have to find the 48th and 49th term and then add them together to find the 50th term.

Pull

Question:　Why is the Fibonacci sequence so special?

Fibonacci numbers are found in nature, art, science, plants, buildings, the human body, music, etc.

A tiling with squares whose sides are successive Fibonacci numbers in length

A Fibonacci spiral created by drawing circular arcs connecting the opposite corners of squares in the Fibonacci tiling; this one uses squares of sizes 1, 1, 2, 3, 5, 8, 13, 21, and 34. See golden spiral.

http://britton.disted.camosun.bc.ca/fibslide/jbfibslide.htm

http://www.youtube.com/watch?v=wS7CZIJVxFY

Example: Determine if the following sequences are Fibonacci-like sequences.

A) $\{\ 2, 3, 5, 8, 13, 31, 34, \ldots\}$

$2+3=5$ $8+13=21$ *Not Fibonacci-like*
$3+5=8$
$5+8=13$

B) $\{\ 7, 8, 15, 23, 38, 61, \ldots\}$

$7+8=15$ *Fibonacci-like*
$8+15=23$
$15+23=38$
$23+38=61$