SECTION 2.4 RECURSIVE SEQUENCES AND SERIES

i) Concept of Recursive Sequences
ii) Fibonacci Sequence
iii) Phone Tree
iv) Rabbit Population Question

WHAT ARE RECURSIVE SEQUENCES:

o A **recursive sequence** is a sequence where each term (t_n) is

o Examples:
- 2, 4, 6, 10, 16, 26, 42,....
- 2, 4, 7, 27, 188, ...
- 1, 2, -3, -5, -16, ...
- The Fibonacci Sequence: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...

Ex: Given that $t_1 = 0$, $t_2 = 3$ and $t_n = t_{n-1} + 2(t_{n-2})$, find t_7

Ex: Find the first 4 terms of the sequence

$$t_1 = 3x \qquad t_n = \frac{t_{n-1} + 2}{n-1}$$

APPLICATIONS OF RECURSIVE SEQUENCES:

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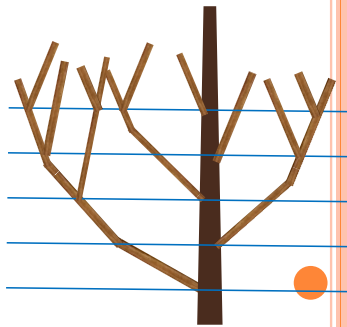
Ex: A principle starts a phone tree by calling 2 teachers. Each teacher is to call two other teachers down the tree. If there are 500 teachers in the school and each call takes 2 minutes, how long will it take to phone all the teachers if the first phone call started at 9:00pm?

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The number of teachers in each level is a recursive sequence:

Each additional level will be an extra 2 minutes to contact everyone

Figure out at which level will a total of 500 people be contacted

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Ex: What are the 4th, 5th and 6th terms of this sequence?

$a_1 = 1$

$a_2 = 2$

$a_{n+1} = \dfrac{a_n + 2}{1 + a_{n-1}}$

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