Exponential Function

SUMMARY

Rate of Change	Constant Ratio $\frac{f(x)}{f(x-1)} = \frac{f(x-1)}{f(x-2)}$
Graph	Curve with a horizontal asymptote
Equations: Recursive	Previous term MULTIPLIED by constant ratio
Explicit	Variable is in the exponent

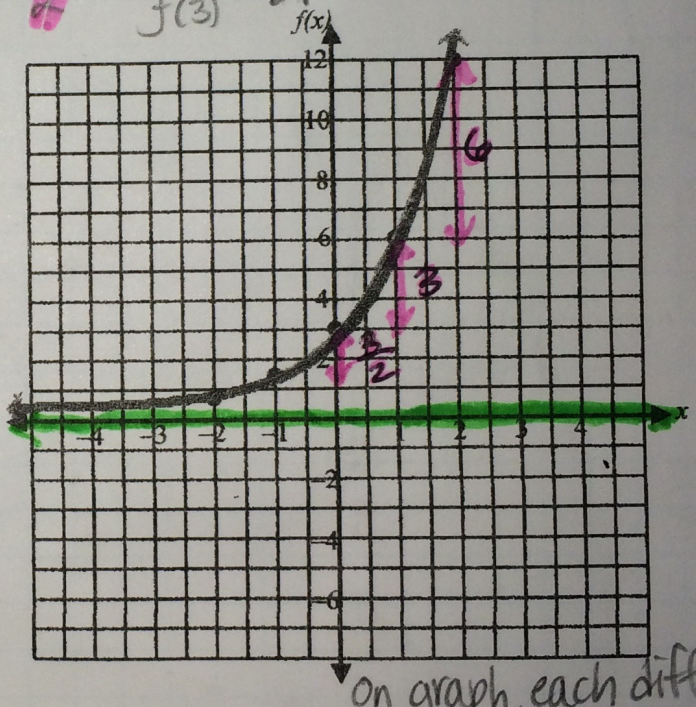
- Repeated MULTIPLICATION by a common ratio → can be rewritten as a POWER
  ex: $5 \bullet 5 \bullet 5 \bullet 5 = 5^4$
- GEOMETRIC sequence is a type of exponential function with a restricted domain, usually to whole or natural numbers.

Example:

Common ratio: $\frac{f(2)}{f(1)} = \frac{6}{3} = 2$ $\quad \frac{f(4)}{f(3)} = \frac{48}{24} = 2$

x	$f(x)$	1st diff.	2nd diff.
−2	$\frac{3}{4}$		
−1	$\frac{3}{2}$	$+\frac{3}{4}$	
0	3	$+\frac{3}{2}$	$+\frac{3}{4}$
1	6	+3	$+\frac{3}{2}$
2	12	+6	+3
3	24	+12	+6
4	48	+24	+12

* 1st & 2nd differences are both EXPONENTIAL!



on graph, each difference in outputs is TWICE the previous difference.

Recursive Equation:

$f(0) = 3;\ f(x) = f(x-1) \cdot 2$

An input of 0 gives an output of 3 : the output when x is the input = the previous value $\bullet$ 2

Explicit Equation:

$f(x) = 3(2)^x$

For any term, start with 3 and multiply by 2 for each term.