Exponential Growth

x	0	1	2	3	4	5	6
y	1	2	4	8	16	32	64

Use the table above to find:

a.) f(4) = _____ b.) f(0)= _____ c.) f(2)=_____ d.) f(5)= _____

Use the function rule to find the following: $f(x) = 2^x$

a. f(1) = _____ b.) f(2) = _____ c.) f(3) = _____ d.) f(4)=_____

Use the function rule to find the following: $f(x) = 2(3)^x$

a. f(1) = _____ b.) f(2) = _____ c.) f(3) = _____ d.) f(4)=_____

Find the power

Use the function rule to find the following values of x: $\boxed{f(x) = 3^x}$

a. $\boxed{f(x) = 3}$ b.) f(x) = 81 c.) f(x) = 9 d.) f(x) = 27

$x=1$ $3^x = 3$ $3^x = 81$ $x=4$ $3^x = 9$ $x=2$ $3^x = 27$ $x=3$

Use the function rule to find the following: $f(x) = 3(2)^x$

a. f(x) = 6 b.) f(x) = 48 c.) f(x) = 12 d.) f(x) = 24

$\frac{\cancel{3}(2)^x}{\cancel{3}} = \frac{6}{3}$ $2^x = 2$ $x=1$

$\frac{3(2)^x}{3} = \frac{48}{3}$ $2^x = 16$ $x=4$

$\frac{3(2)^x}{3} = \frac{12}{3}$ $2^x = 4$ $x=2$

$\frac{3(2)^x}{3} = \frac{24}{3}$ $2^x = 8$ $x=3$

Average Rate of Change (Exponential Functions)

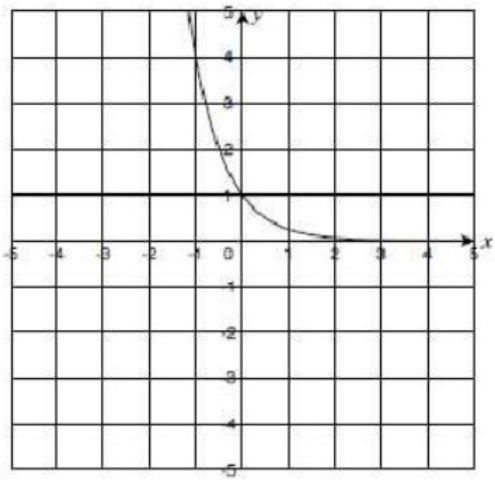
Find the average rate of change for the following functions over the given interval. What does the average rate of change tell you about the function on the interval?

a)

x	0	1	2	3	4
$f(x)$	3	6	12	24	48

From $x = 0$ to $x = 3$

b)



From $x = -1$ to $x = 1$

c. $y = 2^x + 1$ [2, 4]

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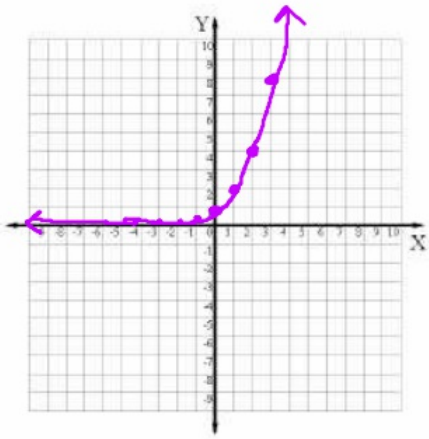
Main Ideas	Details
	Using a graphing calculator, graph the function $f(x) = 2^x$ and sketch the graph on the grid provided below.



x	$y = 2^x$
3	8
2	4
1	2
0	1
-1	1/2
-2	1/4
-3	1/8

1. Is the graph an increasing or decreasing function? Explain your answer.

Left to Right Graph is Increasing

2. Trace or use the table feature on your calculator to fill out the tables below.

As the value of x gets very large, what happens to the value of 2^x?

x	2^x
0	1
1	2
5	32
10	1024
20	1048576

As x gets larger 2^x increase and gets larger

As the value of x gets very small, what happens to the value of 2^x?

x	2^x
−1	1/2
−3	1/8
−5	1/32
−10	1/1024
−20	1/1,048,576

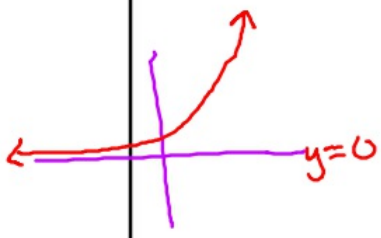
2^x gets smaller, closer to zero, but never touches zero

3. Will the value of 2^x ever equal 0? Explain your answer.

NO, because the numerator will never be 0

4. Are there any values of x that would make 2^x undefined? Explain your answer.

NO, because positive x's are large
negative x's are small
$x=0$ $2^x=1$



5. State the domain and range for $f(x) = 2^x$.

Left to Right ← Domain: $(-\infty, \infty)$

Bottom to Top ← Range: $(0, \infty)$