

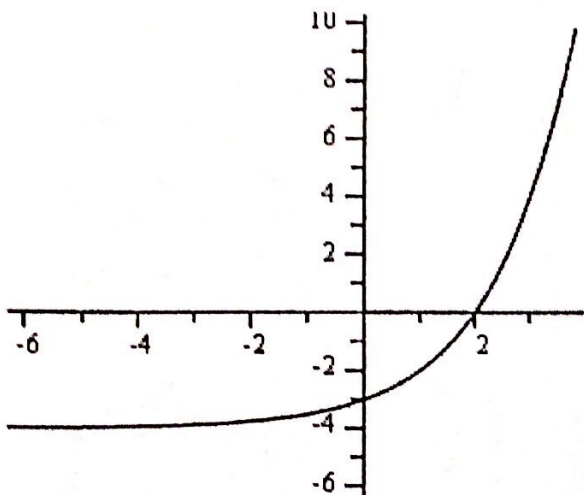
# AVERAGE RATE OF CHANGE

Name W

- 1.) If somebody were to ask you the rate of change for a curve, you would have to say that the rate of change was... NOT constant

## Exponential Growth

Here's the graph of  $y = 2^x - 4$



- 1.) Why is this graph exponential growth?  
it's increasing
- 2.) Where is the rate of change the highest? Explain.  
all the way right b/c steepest

3.) To confirm, find the AVERAGE rate of change for each interval:

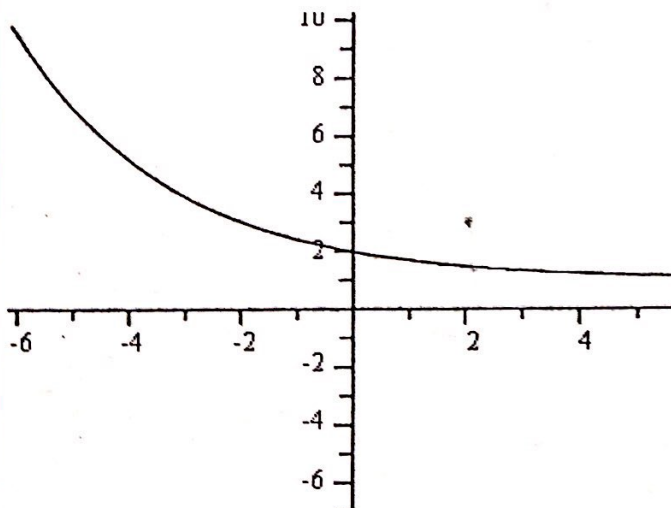
a.) from -6 to -4  $\left( \begin{matrix} (-6, -4) \\ (-4, -4) \end{matrix} \right) \quad \frac{-4 - (-4)}{-4 - (-6)} = \frac{0}{2} = 0$

b.) from 0 to 2  $\left( \begin{matrix} (0, -4) \\ (2, 0) \end{matrix} \right) \quad \frac{0 - (-4)}{2 - 0} = \frac{4}{2} = 2$

c.) from 3 to 5  $\left( \begin{matrix} (3, 4) \\ (5, 28) \end{matrix} \right) \quad \frac{28 - 4}{5 - 3} = \frac{24}{2} = 12$

## Exponential Decay

Here's the graph of  $y = .7^x + 1$



- 4.) Why is this graph exponential decay?  
b/c it's decreasing
- 5.) Where is the rate of change the highest? Explain.  
all the way left b/c steepest there

6.) To confirm, find the AVERAGE rate of change for each interval:

a.) from -6 to -4  $\left( \begin{matrix} (-6, 9.5) \\ (-4, 5.2) \end{matrix} \right) \quad \frac{5.2 - 9.5}{-4 - (-6)} = \frac{-4.3}{2} = -2.15$

b.) from 0 to 2  $\left( \begin{matrix} (0, 2) \\ (2, 1.5) \end{matrix} \right) \quad \frac{1.5 - 2}{2 - 0} = \frac{-0.5}{2} = -\frac{1}{4}$

c.) from 3 to 5  $\left( \begin{matrix} (3, 1.1) \\ (5, 1) \end{matrix} \right) \quad \frac{1 - 1.1}{5 - 3} = \frac{-0.1}{2} = -0.05$

What is the average rate of change for each function over the given interval?

x	f(x)
3	15
4	18
5	21
6	24

x	g(x)
0	1
1	3
2	9
3	27

7.)  $f(x)$  from 3 to 5  
 $\left( \begin{matrix} (3, 15) \\ (5, 21) \end{matrix} \right) \quad \frac{21 - 15}{5 - 3} = \frac{6}{2} = 3$

9.)  $g(x)$  from 0 to 2  
 $\left( \begin{matrix} (0, 1) \\ (2, 9) \end{matrix} \right) \quad \frac{9 - 1}{2 - 0} = \frac{8}{2} = 4$

8.)  $f(x)$  from 4 to 6  
 $\left( \begin{matrix} (4, 18) \\ (6, 24) \end{matrix} \right) \quad \frac{24 - 18}{6 - 4} = \frac{6}{2} = 3$

10.)  $g(x)$  from 2 to 3  
 $\left( \begin{matrix} (2, 9) \\ (3, 27) \end{matrix} \right) \quad \frac{27 - 9}{3 - 2} = \frac{18}{1} = 18$