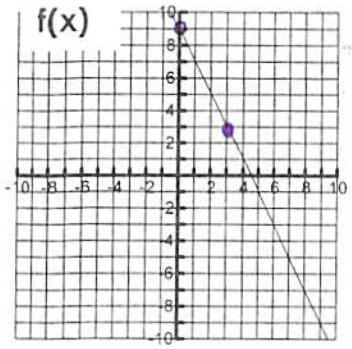
$\frac{y_2 - y_1}{x_2 - x_1}$

Comparing Linear and Exponential Functions Classwork

Name: _____ Date: _____

Linear Functions

1. The functions f(x) and g(x) are described below. Compare the **rate of change** and **intercepts** of each.



Rate of Change:
(0,9)(3,3)
$\frac{3-9}{3-0} = \frac{-6}{3} = -2$

y-intercept:
(0,9)

x-intercept:
(4.5,0)

ROC:
(-2,-10)(-1,-8)
$\frac{-8+10}{-1+2} = \frac{2}{1} = 2$

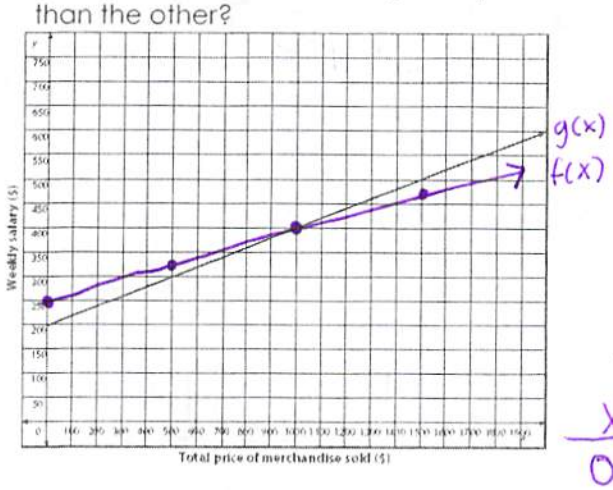
y-int:
(0,-6)

x-int:
(3,0)

x	g(x)
-2	-10
-1	-8
0	-6
1	-4
2	-2
3	0

f(x) & g(x) have same ROC except they are opposites, 1 is + & 1 is −.
g(x) has a positive ROC & is increasing, f(x) has a negative ROC & is decreasing.
f(x) has a greater y-int. f(x) has a greater x-int.

2. Your employer has offered two pay scales for you to choose from. The first option, f(x), is to receive a base salary of $250 a week plus 15% of the price of any merchandise you sell. The second option, g(x), is represented in the graph below. Compare the **rate of change** and **intercepts** of the functions. What does the rate of change tell you about the two scales? When would each scale be better than the other?



f(x)	
ROC:	.15
y-int:	250
x-int:	____

g(x)	
ROC:	.20
y-int:	200
x-int:	____

f(x) = .15x + 250

g(x) = .2x + 200

x	y
0	250
500	325
1000	400
1500	475

g(x) ROC:
(0,200)(500,300)
$\frac{300-200}{500-0} = \frac{100}{500} = .2$

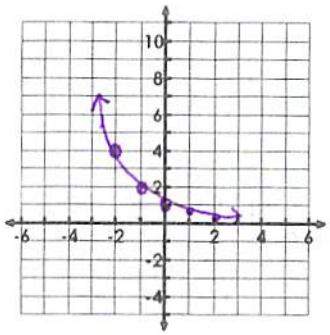
* f(x) has a larger base salary.
* g(x) has a higher ROC, meaning you will get more $ from your sales.
* f(x) is better when you sell less than $1000, g(x) is better when you sell more than $1000.

Comparing Exponential Functions

3. Graph the two functions. Which function has a greater **rate of change** over the interval **[0, 5]**? How do you see that in the graph? Which function has the greater **y-intercept**?

$f(x) = \left(\frac{1}{2}\right)^x$

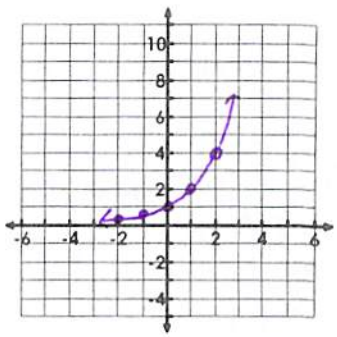
X	Y
-2	4
-1	2
0	1
1	1/2
2	1/4



y-int: (0,1)

$f(x) = 2^x$

X	Y
-2	1/4
-1	1/2
0	1
1	2
2	4



y-int: (0,1)

The 2 functions have the same y-int.

ROC [0,5]
(0, 1)
$(5, \frac{1}{32})$

$$\frac{\frac{1}{32} - 1}{5-0} = \frac{-\frac{31}{32}}{5} = \frac{-31}{160}$$

ROC: -.194

ROC [0,5]
(0, 1)
(5, 32)

$$\frac{32-1}{5-0} = \frac{31}{5}$$

ROC: 6.2

The 2nd functions has a greater ROC over the interval [0,5].