Unit 5 Review Name: Key - WALSH

Comparing Linear, Quadratic and Exponential Functions

For 1 – 3 determine if the table represents a linear, quadratic or exponential function. Write a model for each and give the domain and range.

1.

x	f(x)	
0	5	
1	8	+3
2	11	+3
3	14	+3
4	17	+3

Linear

$y = 3x + 5$

D: R: $\mathbb{R}$

2.

x	f(x)	
0	7	
1	6	−1
2	7	1
3	10	3
4	15	5

Quadratic

$y = (x-1)^2 + 6$

D: R: $\mathbb{R}$

3.

x	y	
0	1	
1	2	×2
2	4	×2
3	8	×2
4	16	×2

Exponential

$y = 1(2)^x$

D: $\mathbb{R}$

R: $(0, \infty)$

4. Name the type of model that fits each data collection. Write a model for each.

a. $\left(-2, \frac{1}{4}\right), \left(-1, \frac{1}{2}\right), (0,1), (1,2), (2,4)$ Exponential $1(2)^x$

b. $(-2,-3), (-1,-1), (0,1), (1,3), (2,5)$ Linear $y = 2x + 1$

c. $(-2,5), (-1,2), (0,1), (1,2), (2,5)$ Quadratic $y = (x-0)^2 + 1$

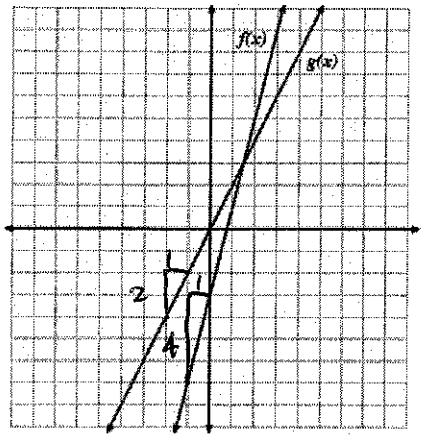
5.

The change in the height of the ball from one bounce to the next if the ball is dropped from a height of 8 feet and the ball bounces to 80% of its previous height with each bounce.

$8(.80)^x$

Type of pattern of change .80 Exponential

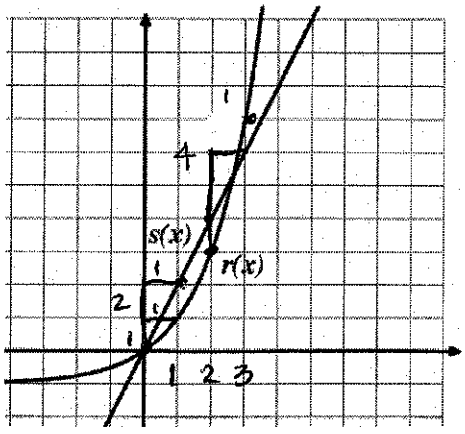
How I found the pattern of change:
Take 80% of previous height bounce



6. Which function has a greater rate of change? Explain.

f(x)
graph/line is steeper

$f(x) = \frac{4}{1} > g(x) = \frac{2}{1}$



7a. Examine the graph at the left from 0 to 1.
Which graph do you think is growing faster?

$s(x) = \frac{2}{1}$ $r(x) = \frac{1}{1}$ s(x) is growing faster

b. Now look at the graph from 2 to 3.
Which graph is growing faster in this interval?

$s(x) = \frac{2}{1}$ $r(x) = \frac{4}{1}$

r(x) is growing faster over this interval

8.

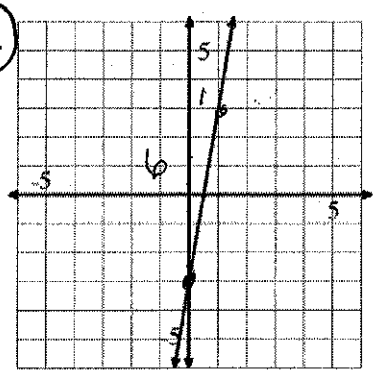
Identify whether situation "a" or situation "b" has the greater rate of change.

a.

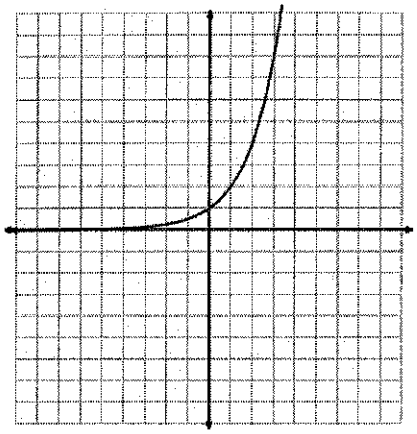
x	y
-10	-48
-9	-43
-8	-38
-7	-33

↓5 ↓5 ↓5

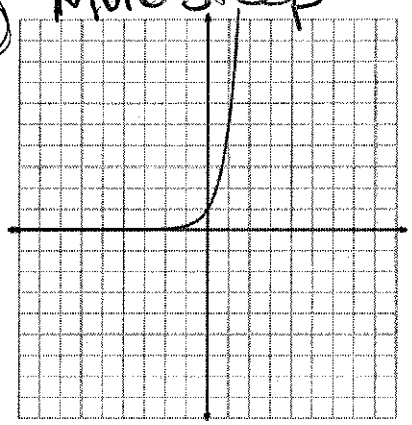
b.



a.



b. More Steep



a. Lee has $25 withheld each week from his salary to pay for his subway pass.

$25x$

b. Jose owes his brother $50. He has promised to pay half of what he owes each week until the debt is paid.

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

* Exponentials always out beat linear functions *

a.

x	6	10	14	18
y	13	15	17	19

+4 +4 +4

+2 +2 +2

1/2

b. The number of rhombi in each shape.

Figure 1 Figure 2 Figure 3

+2 +2

a. $y = 2(5)^x$

larger rate

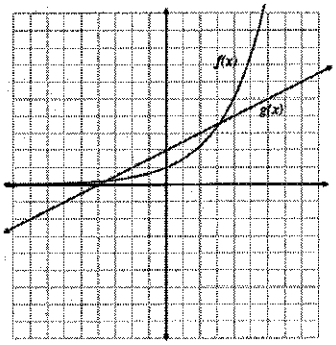
b. In the children's book, *The Magic Pot,* every time you put one object into the pot, two of the same object come out. Imagine that you have 5 magic pots. $5(2)^x$

9.

Compare the rates of change of each pair of functions by identifying the interval where it appears that *f(x)* is changing faster and the interval where it appears that *g(x)* is changing faster. Verify your conclusions by making a table of values for each equation and exploring the rates of change in your tables.

$f(x) = (1.5)^x$

$g(x) = \frac{1}{2}x + 2$



x	$f(x)$	$g(x)$
−2	0.4	1
−1	0.6	1.5
0	1	2
1	1.5	2.5
2	2.25	3
3	3.375	3.5

f

g(x) is greater (−∞, 3)

f(x) is greater for x values greater than 3

11.

Write the explicit equation for the tables and graphs below.

x	$f(x)$
2	-4
3	-11
4	-18
5	-25

$-7x+10$

x	$f(x)$
-1	2/5
0	2
1	10
2	50

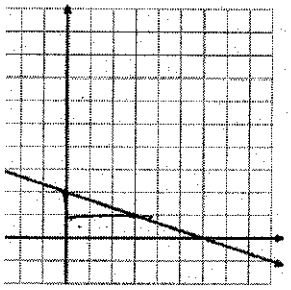
$2(5)^x$

x	$f(x)$
2	-24
3	-48
4	-96
5	-192

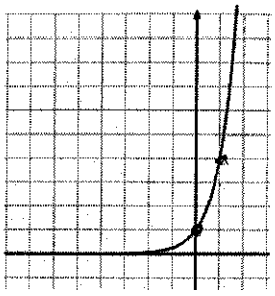
$-6(2)^x$

x	$f(x)$
-4	81
-3	27
-2	9
-1	3

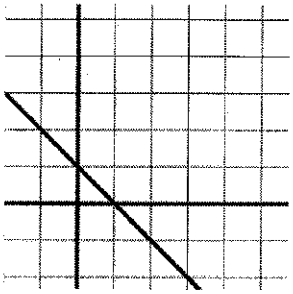
$1\left(\frac{1}{3}\right)^x$



$-3x+2$



$1(4)^x$

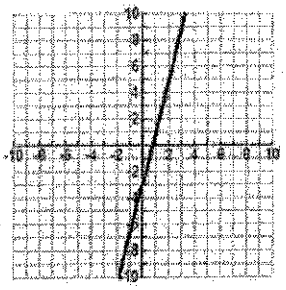


$x+1$

12.

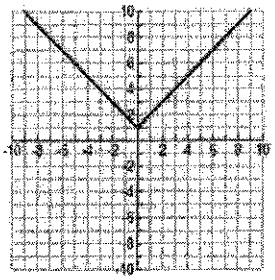
Determine whether the following functions are even, odd, or neither.

1. $f(x)= 4x^1 - 3x^0$



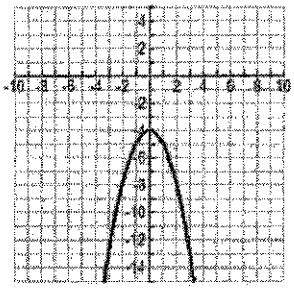
N

2. $f(x)= |x|^1 + 1x^0$



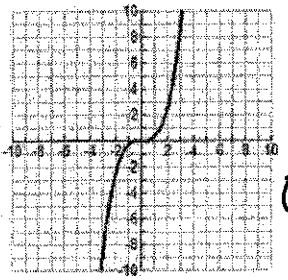
E

3. $f(x)= -x^2 - 4x^0$



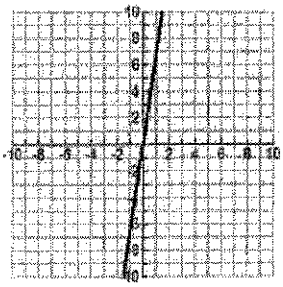
E

4. $f(x)= \frac{1}{3}x^3$



O

5. $f(x)= 7x^1$



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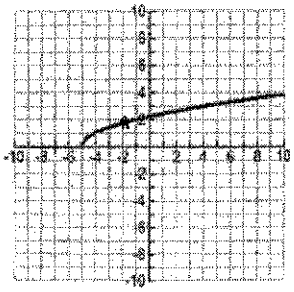
6. $f(x)= \sqrt{x+5}$ $(x+5)^{1/2}$



N

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

E

8. $f(x) = x^3 - 2x^0$

N

9. $f(x)= 3x^1 + 4x^0$

N

10. $f(x)= x^2 - 5x^0$

E

11. $f(x)= 10x^1 + 5x^0$

N

12. $f(x)= 2(x+1)^3$

E N