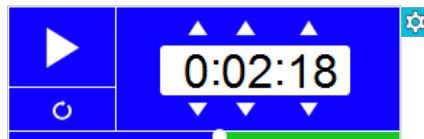


Warm-Up 4/11/18

#12 - 16 of Unit 5 Review



12. Determine the Domain and Range of each of the following graphed functions (using Interval and Set Notations).

A. *Exponential*

Domain (INTERVAL): $(-\infty, \infty)$

all real \mathbb{R} s
Domain (SET): \mathbb{R}

Range (INTERVAL): $(-3, \infty)$

Range (SET): $y > -3$

B. *Quadratic*

Domain (INTERVAL): $(-\infty, \infty)$

Domain (SET): \mathbb{R}

Range (INTERVAL): $[-4, \infty)$

Range (SET): $y \geq -4$

C. *Linear*

Domain (INTERVAL): $(-\infty, \infty)$

Domain (SET): \mathbb{R}

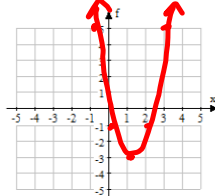
Range (INTERVAL): $(-\infty, \infty)$

Range (SET): \mathbb{R}

Warm-Up 4/11/18

13. Determine the Domain and Range of each of the following graphed functions (using Interval and Set Notations).

A. $m(x) = 2(x - 1)^2 - 3$



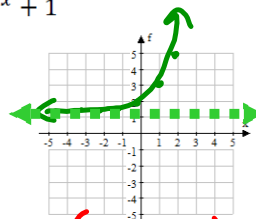
Domain (INTERVAL): $(-\infty, \infty)$

Domain (SET): \mathbb{R}

Range (INTERVAL): $[-3, \infty)$

Range (SET): $y \geq -3$

B. $p(x) = 2^x + 1$



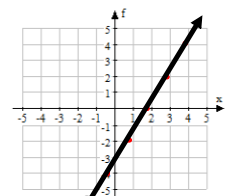
Domain (INTERVAL): $(-\infty, \infty)$

Domain (SET): \mathbb{R}

Range (INTERVAL): $(1, \infty)$

Range (SET): $y > 1$

C. $q(x) = 2x - 4$



Domain (INTERVAL): $(-\infty, \infty)$

Domain (SET): \mathbb{R}

Range (INTERVAL): $(-\infty, \infty)$

Range (SET): \mathbb{R}

14. If we only considered the functions LINEAR, QUADRATIC, and EXPONENTIAL, which is the only one that could have a range of $[-\infty, \infty)$?

Linear

15. If we only considered the functions LINEAR, QUADRATIC, and EXPONENTIAL, which is the only one that could have a range of $(2, \infty)$?

Exponential

16. If we only considered the functions LINEAR, QUADRATIC, and EXPONENTIAL, which is the only one that could have a range of $[-5, \infty)$?

Quadratic

Learning Objectives 4/11/18

Compare and contrast linear, quadratic, and exponential functions and their characteristics.

Opening 4/11/18

- How is a linear function different from a quadratic function?
- How is a quadratic function different from an exponential function?

Day 1 – Distinguishing Between Linear, Quadratic, & Exponential Functions

You should refer to all your graphic organizers about Linear, Quadratic, and Exponential Functions throughout this entire unit.

Identifying Types of Functions from an Equation

Classify each equation as linear, quadratic, or exponential:

a. $f(x) = 3x + 2$ *Linear*

b. $y = 5^x$ *Exponential*

c. $f(x) = 2$ *Linear*

d. $f(x) = 4(2)^x + 1$

Exponential

e. $y = 7(.25)^{3x}$

Exponential

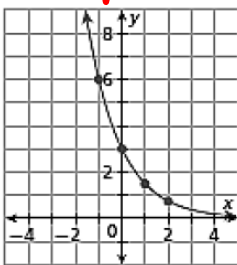
f. $y = 4x^2 + 2x - 1$

Quadratic

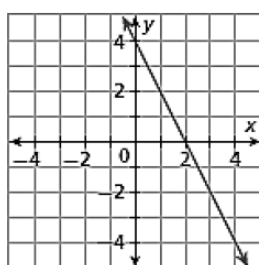
Identifying Types of Functions from a Graph

Determine if the following graphs represent an exponential function, linear function, quadratic function, or neither.

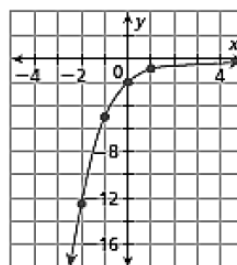
a. **Exponential**



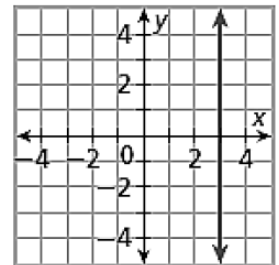
b. **Linear**



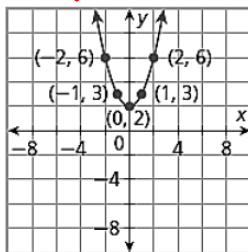
c. **Exponential**



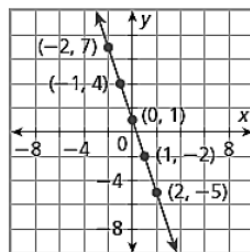
d. **Linear**



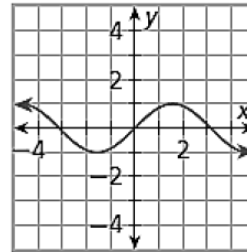
e. **Quadratic**



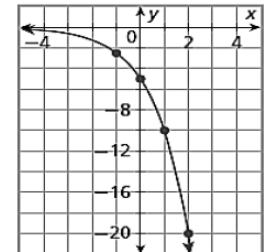
f. **Linear**



g. **Neither**



h. **Exponential**



Identifying Types of Functions from a Table

Remember with linear functions, they have **constant** (same) **first differences** (add same number over and over)

Quadratic Functions have **constant second differences**.

Exponential functions have **constant ratios** (multiply by same number over and over).

Linear

	<i>x</i>	<i>y</i>	
+3	2	4	-1
+3	5	3	-1
+3	8	2	-1
+3	11	1	-1

Function
~~Quadratic Function~~

Quadratic

	<i>x</i>	<i>y</i>	
	0	3	-1
	1	2	+1
	2	3	+3
	3	6	+5
	4	11	

Linear

~~Exponential Function~~

Exponential

	<i>x</i>	<i>f(x) = 2(3)^x</i>	
	1	6	x3
+1	2	18	x3
+1	3	54	x3
+1	4	162	x3

Determine if the following tables represent linear, quadratic, exponential, or neither and explain why.

a.

x	y
-2	7
-1	4
0	1
1	-2
2	-5

Linear

b.

x	y
-1	1.5
0	3
1	6
2	12

Exponential

c.

x	y
-1	-9
1	9
3	27
5	45

Linear

d.

Quadratic

x	y
-2	6
-1	3
0	2
1	3
2	6

e.

Exponential

Volleyball Tournament	
Round	Teams Left
1	16
2	8
3	4
4	2

f.

Exponential

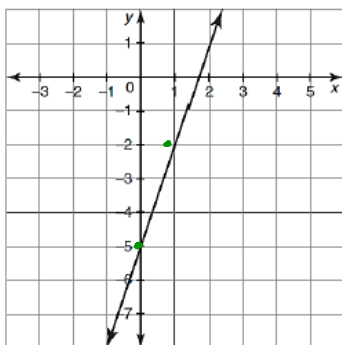
x	$f(x) = 2(3)^x$
1	6
2	18
3	54
4	162

Writing Equations from a Graph or Table

Linear Functions	Quadratic Functions	Exponential Functions
$y = mx + b$ $y = (\text{slope})x + y\text{-intercept}$ slope = # you add/sub each time y-intercept: starting amount or y-value when $x = 0$	$y = a(x - h)^2 + k$ $y = \text{opens}(x - x\text{-value})^2 + y\text{-value}$ (h, k) is vertex $y = a(x - p)(x - q)$ $y = \text{opens}(x - \text{zero})(x - \text{zero})$ You then have to multiply your equation out to get to standard form.	$y = ab^x$ $y = y\text{-intercept}(\text{constant ratio})^x$ y-intercept: starting amount or y-value when $x = 0$ constant ratio = # you multiply by each time

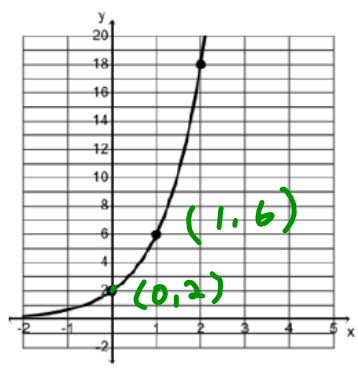
For each table or graph below, identify if it is linear, quadratic, or exponential. Then write an equation that represents it.

a. Type: Linear $y = mx + b$
 Equation: $y = 3x - 5$



$m = \frac{3}{1}$
 $= 3$
 $b = -5$

b. Type: Exponential
 Equation: $y = 2(3)^x$



$y = a \cdot b^x$
 $a = 2$
 $b = \frac{6}{2} = 3$

c. Type: Quadratic.Equation: $x^2 + 9$

x	-3	-2	-1	0	1	2	3
y	0	5	8	9	8	5	0

$$y = (x-h)^2 + k$$

h-int
x
Vertex

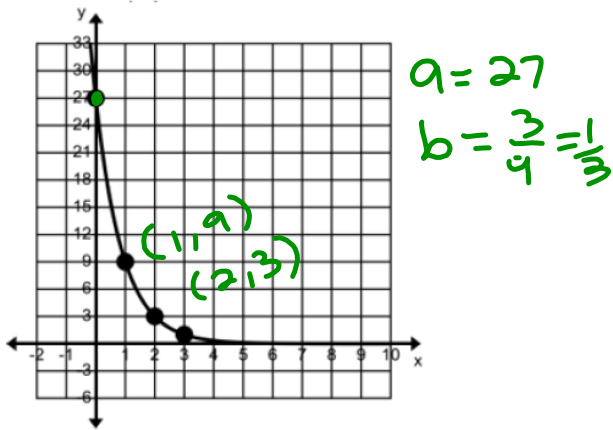
d. Type: LinearEquation: $y = 3x - 7$

x	-3	-2	-1	0	1	2	3
y	-16	-13	-10	-7	-4	-1	2

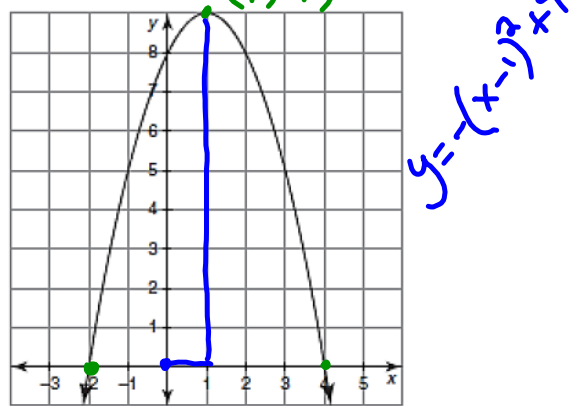
3
3

$m = 3$
 $b = -7$

e. Type: Exponential
 Equation: $y = 27\left(\frac{1}{3}\right)^x$



f. Type: Quadratic
 Equation: $y = -(x+2)(x-4)$
 (1, 9)



g. Type: Linear
 Equation: $y = 5x + 1$

x	-3	-2	-1	0	1	2	3
y	-14	-9	-4	1	6	11	16

$b = 1$
 $m = 5$

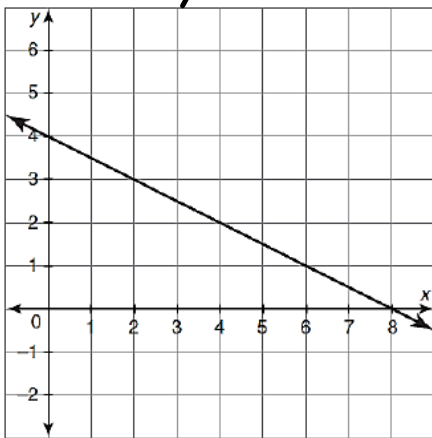
h. Type: Exponential
 Equation: $y = 32(2)^x$

x	-3	-2	-1	0	1	2	3
y	4	8	16	32	64	128	256

$b = 2$
 $a = 32$

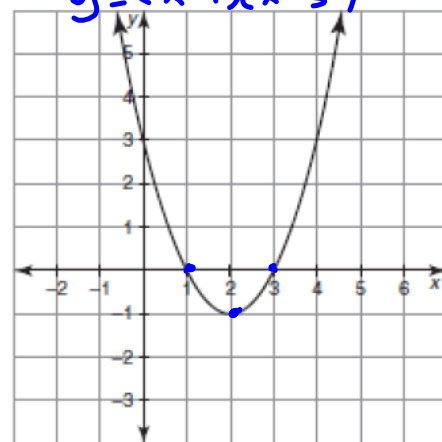
i. Type: linear

Equation: $y = -\frac{1}{2}x + 4$



j. Type: Quadratic

Equation: $y = (x-2)^2 - 1$ *vertex*
 $y = (x-1)(x-3)$



k. Type: Quadratic

Equation: $y = (x+1)^2 + 1$

x	-3	-2	-1	0	1	2	3
y	3	0	-1	0	3	8	15

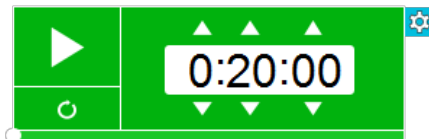
Vertex
 = $(-1, -1)$

l. Type: exponential

Equation: $y = \frac{1}{16}(4)^x$

x	0	1	2	3	4	5
y	$\frac{1}{16}$	$\frac{1}{4}$	1	4	16	64

Class Work 4/11/18



Day 1: Comparing Functions

Name: _____

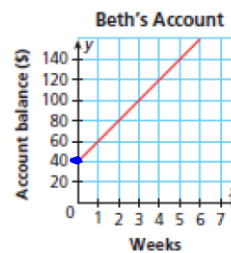
Class Practice Assignment

Block: _____

1. Deidre and Beth each deposit money into their checking accounts weekly. Their account information for the past several weeks is shown below.

$$\frac{75-60}{1-0} = \frac{15}{1}$$

Deidre's Account	
Weeks	Account Balance (\$)
x_1 0	60 y_1
x_2 1	75 y_2
2	90
3	105
4	120



Linear
\$20/week

a. Compare the slopes and y-intercepts and interpret those values in context of the situation.

	Deidre	Beth	Interpret and Compare
Slope	\$15 per week	\$20 per wk.	Beth saves more money each week than Deidre.
Y-intercept	Started with \$60 (0,60)	(0, 40) Beth Started with \$40.	Deidre started off with more money than Beth.