Howdy!!!!

Mr. Watson

Algebra

Given the following sequence write the Explicit and Recursive Formulas

92, 46, 23, 11.5,...

Geometric ÷2

(E) $a_n = 92 \left(\frac{1}{2}\right)^{n-1}$

(R) $a_1 = 92$

$a_n = \frac{1}{2}(a_{n-1})$

57, 38, 19, 0,...

Arithmetic −19

(E) $a_n = 57 + (n-1)^{-19}$

(R) $a_1 = 57$

$a_n = a_{n-1} - 19$

What is the average rate of change between
x = -3 and x = 1:

$$\frac{60}{4} = \boxed{15}$$

4

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

60

What is the average rate of change between
x = 0 and x = 2:

2

$$\frac{-4}{2} \;\; \boxed{-2}$$

x	−3	−2	−1	0	1	2	3
y	0	5	8	9	8	5	0

−4

Identify the following as E, O, N

E

N

E

Identify the following as E, O, N

E

N

O
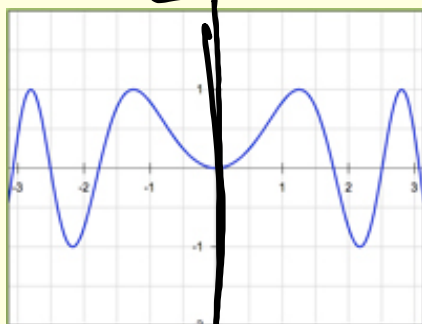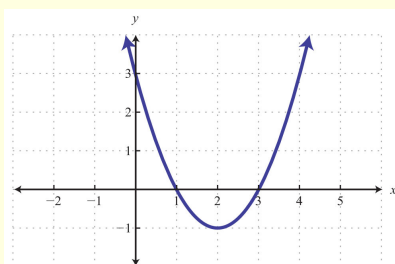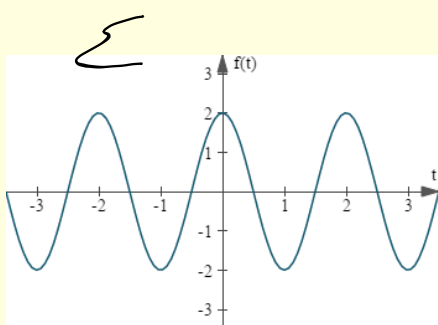
What happens to the point (4, -3) if...

Even Function:

$(-4, -3)$

Odd Function:

$(-4, 3)$

What happens to the point (0, 1) if...

Even Function:

$(0, 1)$

Odd Function:

$(0, -1)$

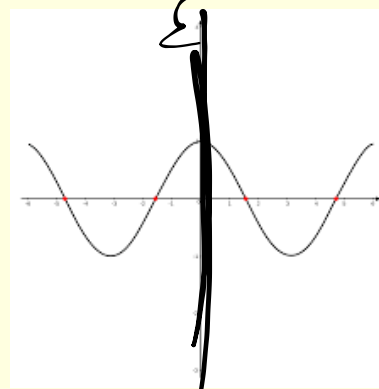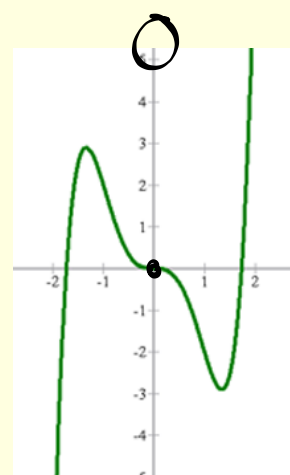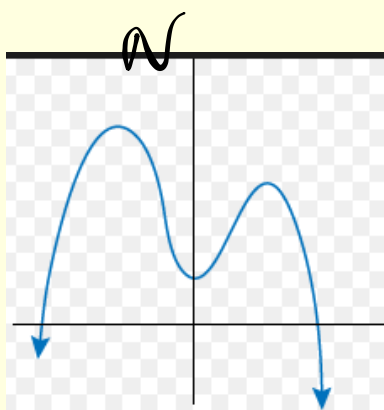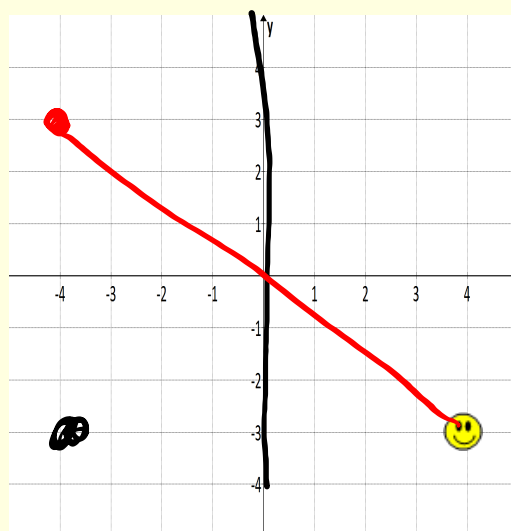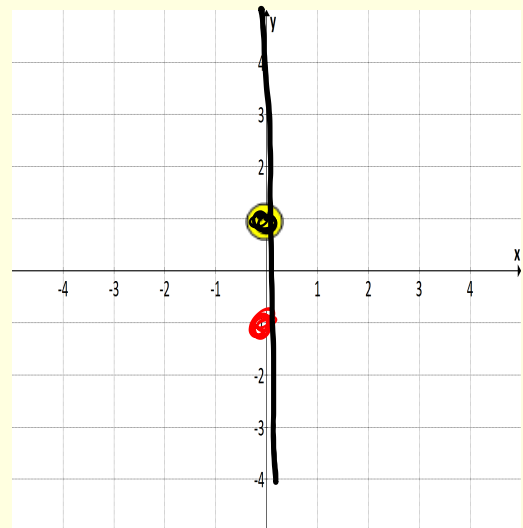# Identify the following as E, O, N

$$y = 3x^1 + 6x^0$$

N

$$y = x^5 + 2x^1$$

O

$$y = 5x^2 + 7x^0$$

E

Identify the following as E, O, N

$$f(x) = -x^9 + 7x^0$$

N

$$f(x) = 3x^8 + 7x^2$$

E

$$f(x) = 8x^0$$

E

Coordinate Algebra Support

Name:_____

Date:_____ Block:_____

Exponential Functions

In the equations below, determine if each function is linear or exponential.

1. $f(x) = 3x + 2$　　L

2. $y = 5^x$　　E

3. $f(x) = 4(2)^x + 1$　　E

4. $y = 7(.25)^{3x}$　　E
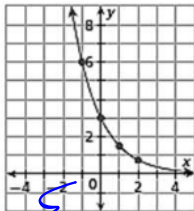
5. $f(x) = 2$　　L
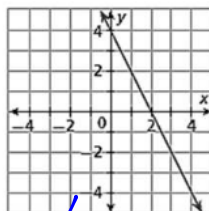
6. $y = x$　　L

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

7.

E

8.

L

9.

E
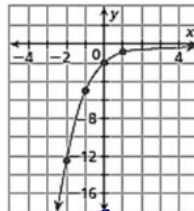
10.

L
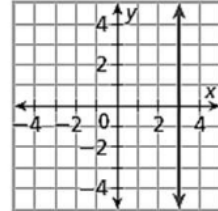
Determine if the following tables represent linear, exponential, or neither.

11.

x	y
−2	7
−1	4
0	1
1	−2
2	−5

−3, −3, −3, −3

Linear

12.

x	y
−1	1.5
0	3
1	6
2	12

1.5, 3, 6 / 1.5, 3

Expo

13.

x	y
−1	−9
1	9
3	27
5	45

18, 18, 18

Linear

14.

x	y
−2	6
−1	3
0	2
1	3
2	6

−3, −1, +1, +3 / 2, 2, 2

Quadratic

Determine whether the function represents exponential growth or exponential decay. Then, determine the constant ratio.

15. $f(x) = 4^x$

Growth
4

16. $y = 2(0.55)^x$

Decay
.55

17. $f(x) = \left(\frac{3}{4}\right)^x$

Decay
$\frac{3}{4}$

18. $y = 5^x + 1$

Growth
5

r

Name_____   Date_____

Compare / Contrast: Linear, Quadratic, and Exponential Functions, Part 1

Show similarities and differences between linear, quadratic, and exponent functions:
What things are being compared? How are they similar? How are they different?

Functions to Graph and Discuss:

$f(x) = 2x + 3$ $f(x) = 2x^2 + 3$ $f(x) = 2^x + 3$

Attribute	Linear Functions	Quadratic Functions	Exponential Functions
Rate of change			
Domain & Range			
Intercepts			
Asymptotes			
End Behavior			

Comparing Linear, Quadratic, and Exponential Models Graphically (Part 3)

Name_____　　　　　　Date_____

1.　　Complete the tables below.

Linear			Quadratic			Exponential	
$f(x) = 2x$ 2(-5)			$g(x) = x^2$ (-5)²			$h(x) = 2^x$ 2⁻⁵	
x	**f(x)**		**x**	**g(x)**		**x**	**h(x)**
−5			−5			−5	
−4			−4			−4	
−3			−3			−3	
−2			−2			−2	
−1			−1			−1	
0			0			0	
1			1			1	
2			2			2	
3			3			3	
4			4			4	
5			5			5	

2.   Draw and label each graph on the same set of axes.
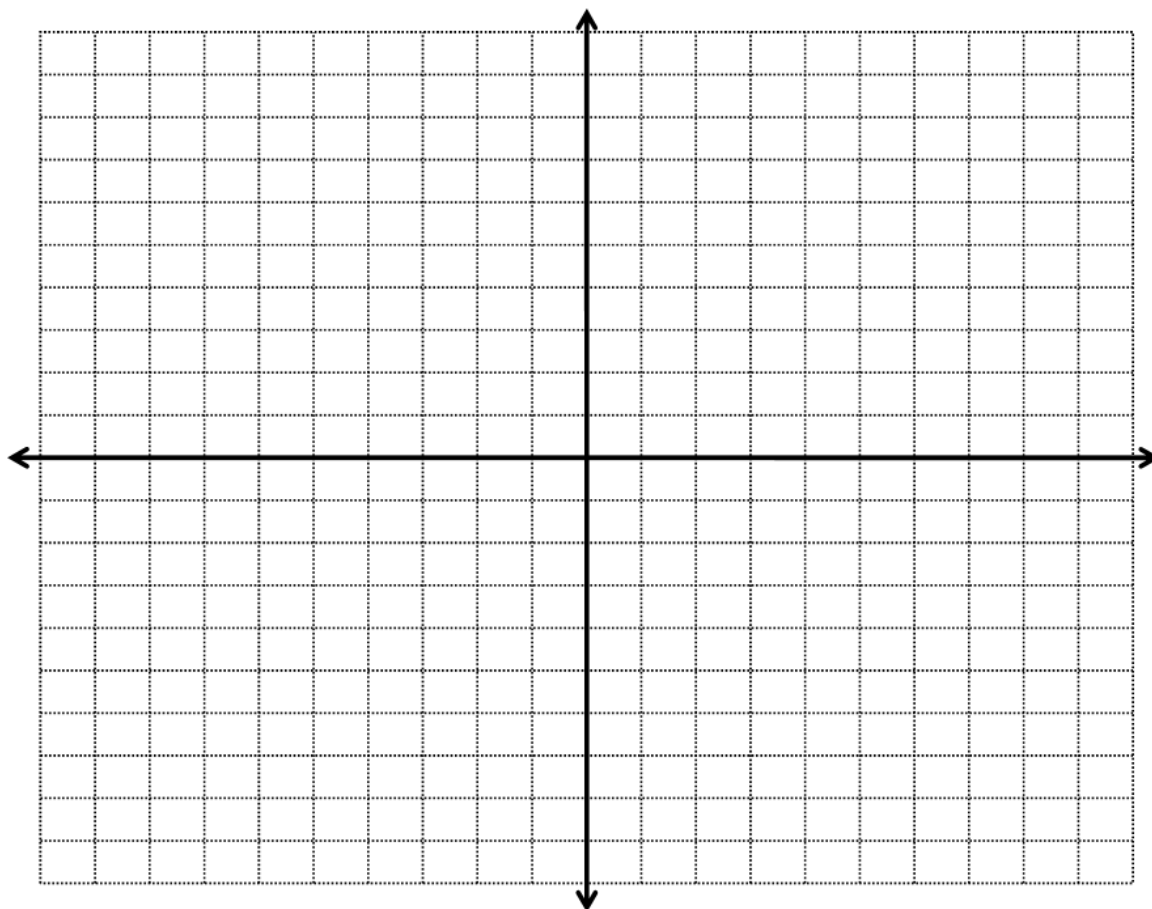
3.   Identify the following features of each function.

(a) Domain and Range

Linear   D: $\mathbb{R}$
         R: $\mathbb{R}$

Quadratic   D: $\mathbb{R}$
            R: $y \geq 0$

Expo   D: $\mathbb{R}$
       R: $y > 0$

(b) Description of Shape

Line   U-shape   Curve

(c) Any characteristics unique to each function

Georgia Standards Of Excellence

Sec 5.3 – Average Rate of Change Comparison
Linear, Quadratic, or Exponential Functions　　　Name: _____

1. Find the average rate of change from $x = -1$ to $x = 2$ for each of the functions below.

　a. $a(x) = 2x + 3$　　　　b. $b(x) = x^2 - 1$　　　　c. $c(x) = 2^x + 1$

x	y
-1	1
2	7

$3 < \quad > 6$

$\dfrac{6}{3} = 2$

x	y
-1	0
2	3

$3 < \quad > 3$

$\dfrac{3}{3} = 1$

x	y
-1	1.5
2	5

$3 < \quad > 3.5$

$\dfrac{3.5}{3} = 1.16$

　d. Which function has the greatest average rate of change over the interval $[-1, 2]$?

Linear (A)

2. Find the average rate of change on the interval $[2, 5]$ for each of the functions below.

　a. $a(x) = 2x + 1$　　　　b. $b(x) = x^2 + 2$　　　　c. $c(x) = 2^x - 1$

x	y
2	5
5	11

$3 < \quad > 6$

2

x	y
2	6
5	27

$3 < \quad > 21$

7

x	y
2	3
5	31

$3 < \quad > 28$

9.3

　d. Which function has the greatest average rate of change over the interval $x = 2$ to $x = 5$?

Expo (C)

3. In general as $x \to \infty$, which function eventually grows at the fastest rate?

　a. $a(x) = 2x$　　　　b. $b(x) = x^2$　　　　c. $c(x) = 2^x$

$C(x) = 2^x$ will grow the fastest. It is exponential

4. Find the average rate of change from **x = – 1** to **x = 2** for each of the continuous functions below based on the partial set of values provided.

a.

x	– 1	0	1	2	3
a(x)	– 3	– 2	1	6	13

$\dfrac{9}{3}$

3

b.

x	– 1	0	1	2	3
b(x)	1	3	5	7	9

$\dfrac{6}{3}$

2

c.

| x	– 1	0	1	2	3
c(x)	– 2	– 1	1	5	13

$\dfrac{7}{3}$

2.3

d. Which function has the greatest average rate of change over the interval [– 1, 2]?

Function A

5. Consider the table below that shows a partial set of values of two continuous functions. Based on any interval of **x** provided in the table which function always has a larger average rate of change?
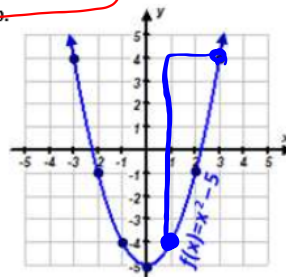
x	f(x)	g(x)
– 1	– 2	– 4
0	0	0
1	3	8
2	7	24

6. Find the average rate of change from **x = 1** to **x = 3** for each of the functions graphed below.

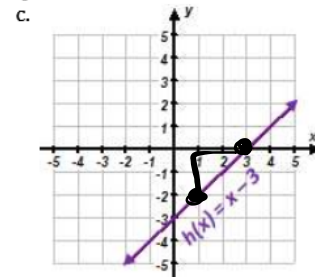a.

$g(x)=2^x-5$

$\dfrac{6}{2}$

3

b.

$f(x)=x^2-5$

$\dfrac{8}{2}$

4

c.

$h(x)=x-3$
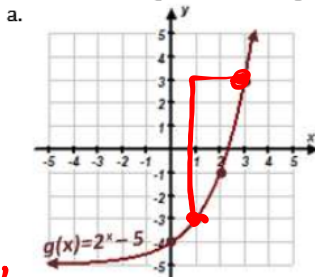
$\dfrac{2}{2}$

1

d. Find an interval of x over which all three graphed functions above have the same average rate of change.

Plot On/Off

Window Button

Regresion

Graphing

Writing Linear, Quadratic, and Exponential Equations

1. (20, 372), (30, 462), (40, 509), (50, 501), (60, 437), (70, 323)

  a. Create a scatter plot of the data. Is it linear, quadratic, or exponential?

  b. Use your calculator to write an equation to model the information.

$$y = -.26x^2 + 22.59x + 23.02$$

2.

Price Charged	$20	$30	$40	$50	$60
Daily Customers	140	75	40	22	10

  a. Create a scatter plot of the data. Is it linear, quadratic, or exponential?

  b. Use your calculator to write an equation to model the information.

$$y = 528.56 \cdot .93^x$$

  c. How many customers would you expect if they charged $10 per day?

$$255.81$$

3. When businesses do market research for new products, they are interested in the relation between the prices they charge and the income they will receive from sales. For example, suppose that the owners of Video City are trying to set the best rental price for video game cartridges. Their market research staff might produce a recommendation that says: *Profit (in dollars per week) depends on charge per rental (in dollars) according to the rule* $P = -750 + 900c - 150c^2$

  a. Is the equation linear, quadratic, or exponential?

  b. What would the weekly profit be if they charged $2 per rental?

4. In public transportation systems of most U.S. cities, the fare is generally related to distance traveled and time of day (higher in morning and evening rush hours). The fare pattern for one city's subway system is illustrated in the following table.

Distance (in miles)	1	2	3	4	5	6	7	8
Fare (in $)	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80

    a. Is the data linear, quadratic, or exponential?

    b. Write an equation to model the fare.

    c. How much would they charge for 12 miles?

5.

Number of Tickets Sold	Dollars of Income
0	0
50	125
100	250
150	375
200	500
250	625
300	750

a. Is the data linear, quadratic, or exponential?

b. Write an equation to model the income.

6. John kicked a soccer ball and recorded the height of a soccer ball over 6 seconds.

Time (seconds)	0	1	2	3	4	5
Height (feet)	0	2.75	5	6.75	8	8.75

    a. Create a scatter plot of the data. Is it linear, quadratic, or exponential?

   b. Use your calculator to write an equation to model the information.

7. Beth invested some money in the stock market at a 10% interest rate. The table shows the value of her investment over the first few years.

Time (in years)	0	1	2	3	4	5
Value (in $)	1500	1650	1815	1996.5	2196.2	2415.8

      a. Create a scatter plot of the data. Is it linear, quadratic, or exponential?

      b. Use your calculator to write an equation to model the information.

      c.   How much will her investment be worth in 10 years?

8. The bowhead whale population is represented by the equation $y = 5700(1.03)^x$, where x represents the number of years after 1992.

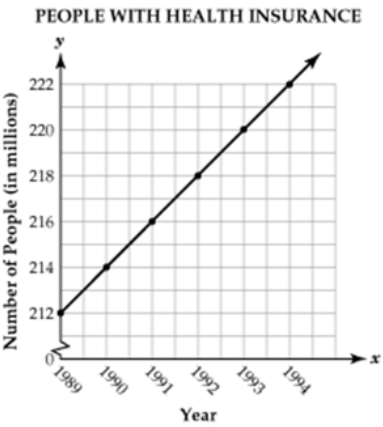   a. Is the situation modeled by a linear, quadratic, or exponential equation?

9.
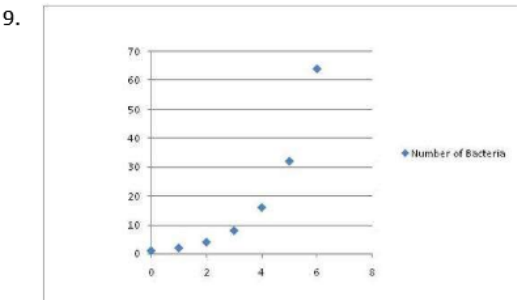
a. Is the data linear, quadratic, or exponential?

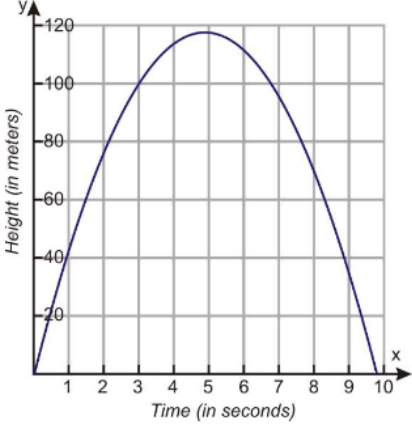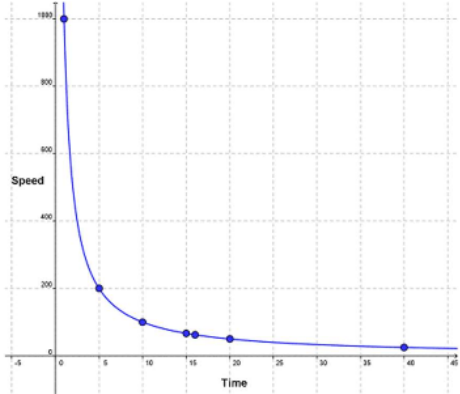b. Write an equation to model the income (estimate the coordinates of 3 points).
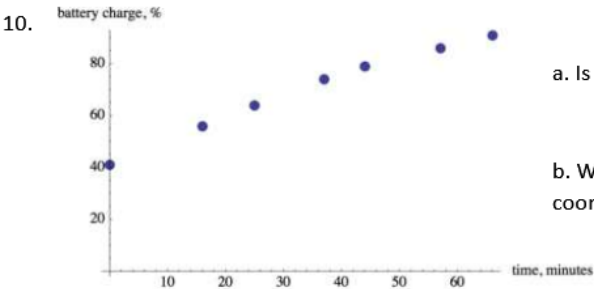
10.

a. Is the data linear, quadratic, or exponential?

b. Write an equation to model the data (estimate the coordinates of 3 points and use them in the stat lists).

11.

PEOPLE WITH HEALTH INSURANCE

a. Is the data linear, quadratic, or exponential?

b. Write an equation to model the data (estimate the coordinates of 3 points and use them in the stat lists).

12.

a. Is the data linear, quadratic, or exponential?

b. Write an equation to model the data (estimate the coordinates of 3 points and use them in the stat lists).

13.

a. Is the data linear, quadratic, or exponential?

b. Write an equation to model the data (estimate the coordinates of 3 points and use them in the stat lists).

Review

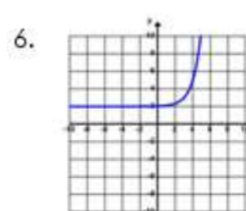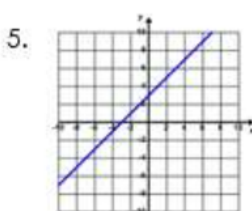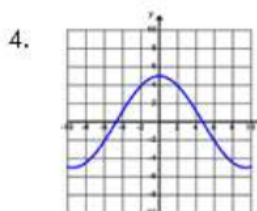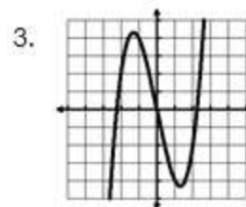Algebra 1   Unit 8—Comparing Functions   Review
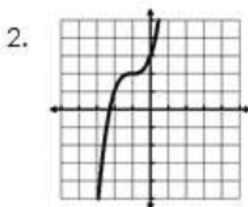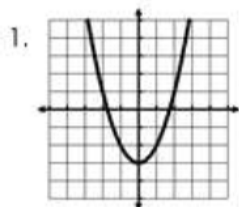   Name _____ Date _____

Unit 8 Review

For problems 1-12, decided if the functions are even, odd, or neither.

1.

2.

3.

4.

5.

6.

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

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

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

10. $f(x) = \frac{1}{2}x^4 + 9$

11. $f(x) = 5x + 1$

12. $f(x) = 5$

Fill in the chart describing the differences in each type of function.

Name of Function	Equation	Key characteristics	Sketch of the graph
Linear			
Quadratic			
Exponential			

Algebra 1   Unit 8—Comparing Functions   Review

Identify the following equations as linear, quadratic or exponential.

1. $y = 10\left(\frac{1}{3}\right)^x$	2. $y = 5 + 7(x)$
3. $y = (x+3)^2 - 4$	4. $y = -2(x) + 5$
5. $y = -\frac{1}{2}(3)^x$	6. $y = \frac{1}{3}(x)^2 - 4$
7. $y = 4^x + 6$	8. $y = -\frac{3}{2}x - 3$
9. $y = x^2 - 5x + 6$	10. $f(x) = (x-2)^2 + 7$

1. Look at the following tables and decide if they represent a linear, exponential, or quadratic function.

x	y
-4	5
-3	8
-2	13
-1	20
0	29
1	40

x	y
-5	32
-4	16
-3	8
-2	4
-1	2
0	1

x	y
-2	-2.75
0	-2
2	1
4	13
6	61
8	253

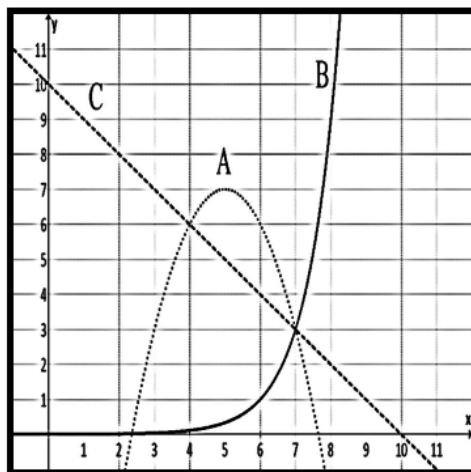| x	y
0.5	0.9
0.75	1.1
1	1.3
1.25	1.5
1.5	1.7
1.75	1.9

Algebra 1   Unit 8—Comparing Functions   Review

Use the following graph to answer the following questions:

Which function is linear? Exponential? Quadratic?

List the functions in order from smallest to largest based on x-intercepts:

List the functions in order from smallest to largest based on y-intercepts:

List the functions in order from smallest to largest when x = 2:

List the functions in order from smallest to largest when x = 5:

List the functions in order from smallest to largest when x = 9:

List the functions in order from smallest to largest when x = 15:

Which functions have a positive rate of change through the entire graph?

Which functions have a negative rate of change through the entire graph?

Which function has a rate of change that can be both positive and negative?

Which functions go towards negative infinity as x goes towards infinity?

Which functions go towards positive infinity as x goes towards infinity?

Attachments

Syllabus - Math I A.doc

Even Odd Neither.ppt