What is the difference between an exponential function and a linear function?

00:00 00 ▶

Week 2, Lesson 1

1. Warm Up
2. Exponential Introduction
3. ICA
4. Homework

Exponential Introduction

What is the difference between an exponential function and a linear function?

15

Warm Up:

00:00 00 ▶ ↻

Go to page 6 you have vocabulary words there.

1) What is the definition of Vertex?

2) What is the definition of Linear?

3) What is the definition of Quadratic?

4) What is the definition of Domain?

5) What is the definition of Solutions?

6) What is the definition of Range?
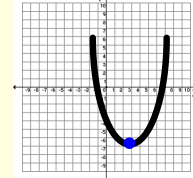
Warm Up Answers

Minimum

1) Vertex-

  Define: The middle point where the graph changes directions
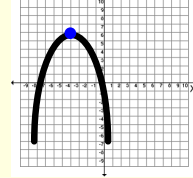
  Minimum: The lowest point of the graph
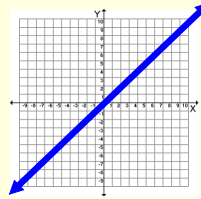
  Maximum: The highest point of the graph
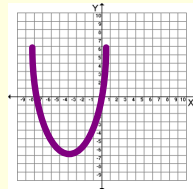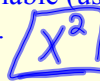
Maximum

2) Linear-

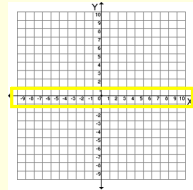 Define: The equation for a straight line

      (standard 6.2)

3) Quadratic-

  Define: An equation where the highest exponent of the variable (usually "x") is a square (2). x^2
      (standard 6.3)

4) Domain-

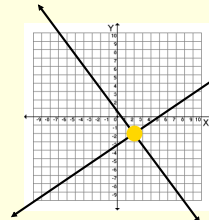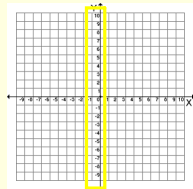 Define: All possible x values

5) Solutions-

  Define: A point that makes both equations true. On a graph it is where the lines intersect.

6) Range-

  Define: All possible y values

For those 6 words you need to decide if you really know them by heart yet or not.

If you do place them in your "Know" envelope

If you do not place them in your "Need to Know" envelope

      DO NOT FORGET TO STUDY THEM!!!!!
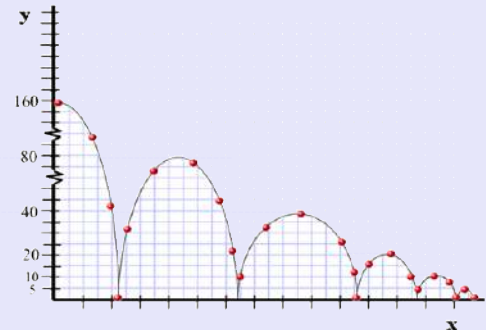
Exponential Introduction

00:00 00

Standard 6.4

Week 2, Lesson 1
Ball Bounce Activity

In a Ball Bounce activity, the graph of time after the ball released vs. the height of the ball from the ground forms a series of parabolas.
The graph looks something like this:

In this activity, we are going to investigate how the maximum height of each parabola changes from bounce to bounce.

From your ball bounce data, complete the chart, giving the maximum height of each bounce.

Bounce Number	Height (in ft.)
0	160
1	80
2	40
3	20
4	10
5	5

Make a scatterplot of the data in your chart. What kind of function do you think would model this data? Complete the appropriate regression, and add the curve to your scatterplot. Give your regression equation and sketch the graph below.
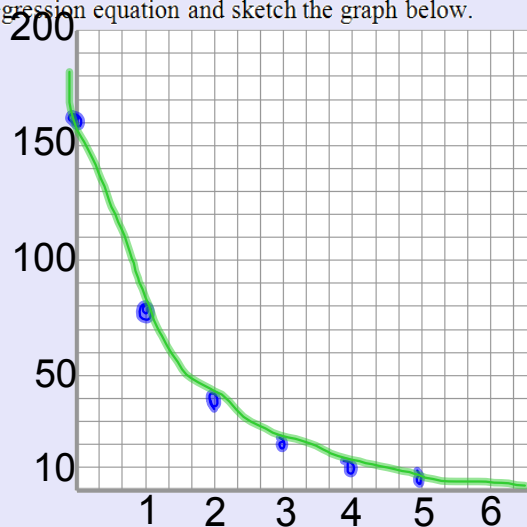
You probably found an exponential regression, an equation of the form $y = ab^x$. What might a stand for in the real world situation? What might b stand for in the real-world situation?

Summary:

ICA:

1) Graph: $y = -|x-2| + 6$
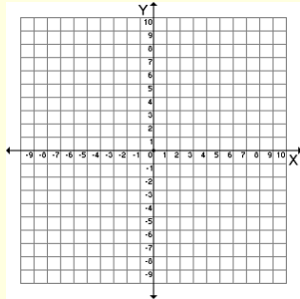
Vertex:
Domain:
Range:

2) Graph: $y > 2x+7$
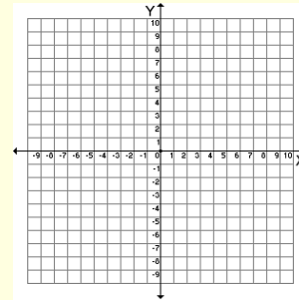
Domain:
Range:

3) Graph: $y = -3(x-2)^2 + 2$
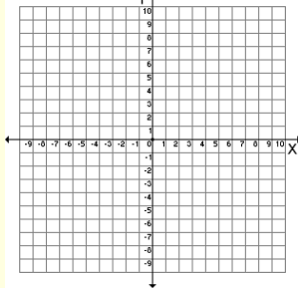
Circle one: Minimum or Maximum
Vertex:
Domain:
Range:

4) Graph: $-32 = -4x^2 + 8x$
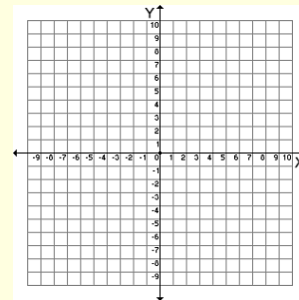
Circle one: Minimum or Maximum
Solution:

5) Compare and contrast the two given functions $y = x^2$ and $y = (x+2)^2 - 2$

Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure

Right Side...

Write a summary that answers the essential question.

Left Side...

Quick write:

After reviewing how ready are you for next weeks test?

MS 2 Week 2

Tutoring/ Homework:

~*~*~STUDY FOR YOUR 3 Week Test~*~*~

ICA:

1.) Find the perimeter of a rectangle whose length is 5.2×10^3 and width is 6.3×10^3

2.) Find the area of a rectangle whose length is 2.5×10^{-5} and width is 3.5×10^3

3.) The average speed of a sprinter is 3.6yds/sec. How many meters does he run in 1 minute? (1 yd. = 0.91 m)

4.) The average speed of a sprinter is 5.2yds/sec. How many meters does he run in 1 minute? (1 yd. = 0.91 m)

5.) Find the area of a rectangle whose length is 6.2×10^5 and width is 8.5×10^9

What is the difference between an exponential function and a linear function?

00:00 00

Week 2, Lesson 2

1. Warm Up
2. Exponential Equations
3. ICA
4. Homework

Exponential Equations

What is the difference between an exponential function and a linear function?

17

Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-

00:00 00

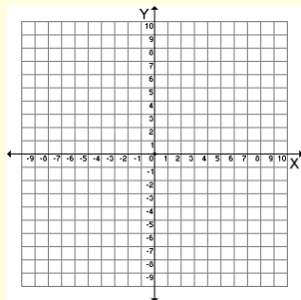Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

Warm up:

Graph the following.

$$y = 3x - 2$$

$$y = x^2 + 2x - 15$$
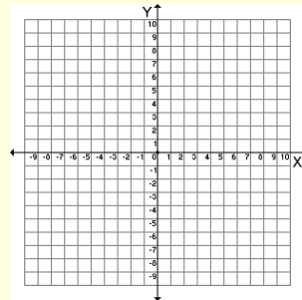
Exponential Equations

Standard 6.4	**Vocabulary:**
	Point of inflection- Where the graph curves
	How to find it-
	Asymptote- The lie the graph cannot tough or cross "can't touch this"
	How to find it-

Summary:

ICA: Fill in the t-chart for the following graph and then try to graph it.

$$y = 2^x$$

X	Y
-2	
-1	
0	
1	
2	

Right Side...

Write a summary that answers the essential question.

Left Side...

$$y = 3(4)^{x-3} + 2$$

Write out the steps to find the point of inflection and find out what it is.

MS 2 Week 2
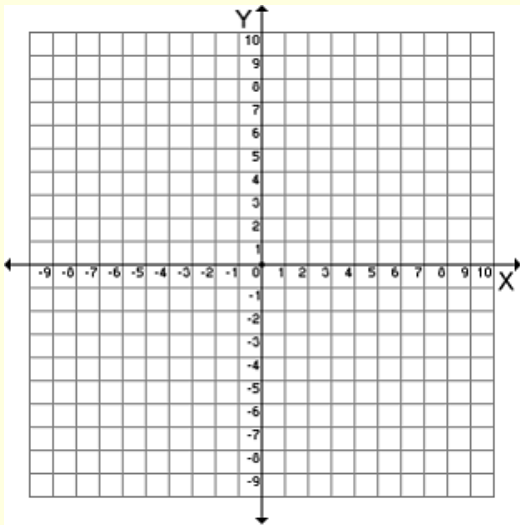
Tutoring/ Homework:

1. $y = 2^{x-3} - 4$

Point of
inflection
(,)

Horizontal
asymptote
y=

2. $y = 4^x - 3$

Point of
inflection
(,)
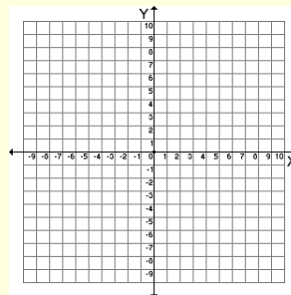
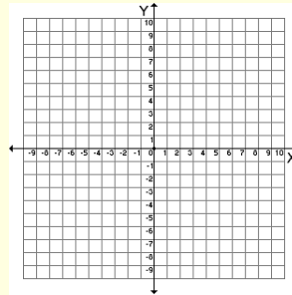Horizontal
asymptote
y=

3. $y = 3^{x+2} + 4$

Point of
inflection
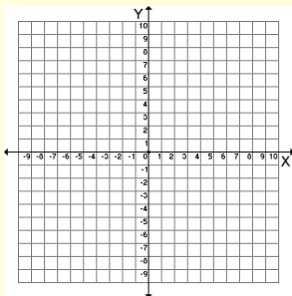(,)

Horizontal
asymptote
y=

4. $y = 2(3)^{x+1} + 1$

Point of
inflection
(,)

Horizontal
asymptote
y=

5. $y = 3(2)^{x+5} - 1$

Point of
inflection
(,)

Horizontal
asymptote
y=

6. $y = 2^{x-7} + 3$

Point of
inflection
(,)

Horizontal
asymptote
y=

ICA: Practice graphing the following.

1. $y = 2^{x-4} + 8$

Point of inflection
(,   )

Horizontal asymptote
y=

1. $y = 2 \cdot 5^{x+3} - 4$

Point of inflection
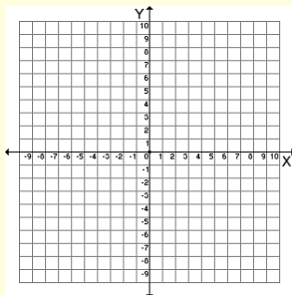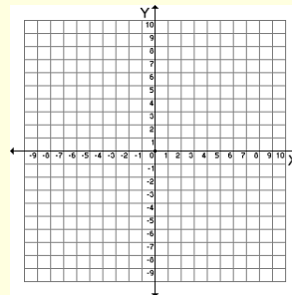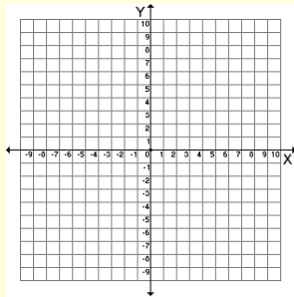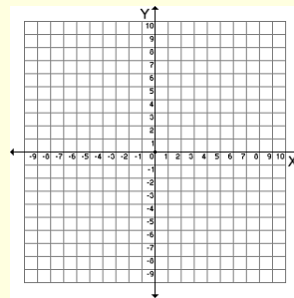(,   )

Horizontal asymptote
y=

How are exponential growth and decay different both in equation form and graph form?

Week 2, Lesson 3

1. Warm up
2. Exponential Standard Form
3. ICA
4. Homework

Exponential Standard Form
How are exponential growth and decay different both in equation form and graph form?

19

Warm up:

Define:
1. System
2. y-intercept
3. zeros
4. exponential
5. x-intercepts

Homework review

1. $y = 2^{x-3} - 4$
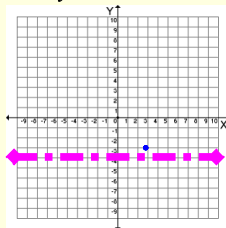
Point of inflection
(3 , -3)

Horizontal asymptote
y= **-4**

4. $y = 2(3)^{x+1} + 1$
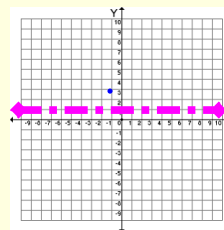
Point of inflection
(**-1** , **3**)

Horizontal asymptote
y= **1**

2. $y = 4^x - 3$
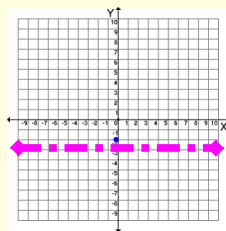
Point of inflection
(0 , -2)

Horizontal asymptote
y= **-3**

5. $y = 3(2)^{x+5} - 1$
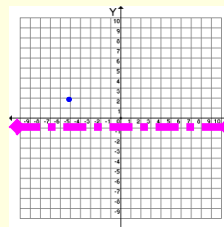
Point of inflection
(**-5** , **2**)

Horizontal asymptote
y= **-1**

3. $y = 3^{x+2} + 4$
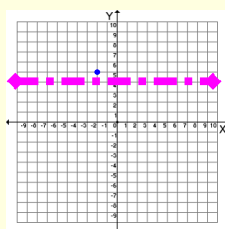
Point of inflection
(**-2** , **5**)

Horizontal asymptote
y=

6. $y = 2^{x-7} + 3$
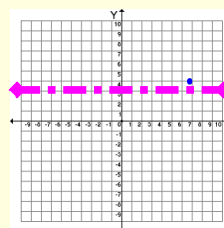
Point of inflection
(**7** , **4**)

Horizontal asymptote
y=

Define:
1. System   where there are two equations and we are looking for one point to make both equations true

2. y-intercept   where the graph crosses the y-axis

3. zeros
   x-intercepts   where the graph crosses the x-axis

4. exponential   involving one or more numbers or quantities raised to an exponent
                  standard 6.4

Growth: when the common ratio is **GREATER** than 1
Decay: when the common ratio is **LESS** than 1

Exponential Standard Form

Standard
6.4

Vocabulary:

Standard form of an equation of exponential growth or decay-

$$y = a (b)^{x-h} + k$$

a= ↑ or ↓ if it moves fast or slow

b= Common Ratio   (how it changes)

h= horizontal shift   ← or →

k= Vertical Shift   ↑ or ↓

Exponential Growth- when the common ratio (b) is **GREATER** than 1

when a is negative (kids in china)-

USA (+a)
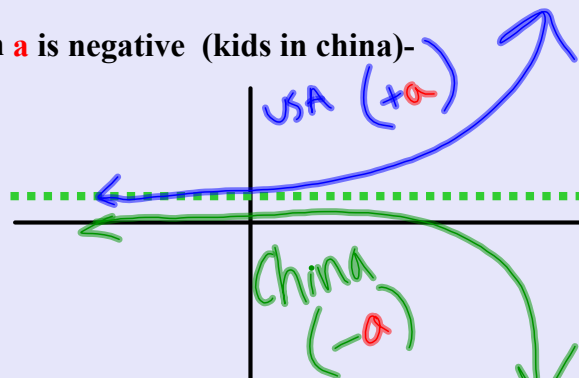
China (-a)

Exponential Decay- when the common ratio (b) is **LESS** than 1

when a is negative (old ladies in china)-

USA ((+a))

China ((-a))

Summary:

ICA: Fill in the t-chart for the following graph and then try to graph it.

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

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

$$b = \text{Common Ratio} = \frac{1}{2}$$

Decay because it is less than 1

Right Side...

Write a summary that answers the essential question.

Left Side...   Graph the following 2 problems.

$$y = 2\left(\frac{3}{4}\right)^{x-3} + 1$$

Point of inflection
(,   )

Horizontal asymptote
y=

$$y = -2\left(\frac{3}{4}\right)^{x-3} + 1$$

Point of inflection
(,   )

Horizontal asymptote
y=

Tell how they are the same and how they are different.

MS 2 Week 2

Left Side...

Graph the following 2 problems.

$$y = 2\left(\frac{3}{4}\right)^{x-3} + 1 \qquad y = -2\left(\frac{3}{4}\right)^{x-3} + 1$$

Point of inflection
(3,3)

Horizontal asymptote
y= 1

Point of inflection
(3,-1

Horizontal asymptote
y= 1

Tell how they are the same and how they are different.

MS 2 Week 2

Tutoring/ Homework:

1. $y = -3(4)^{x-1} + 5$

Point of inflection
(,   )

Horizontal asymptote
y=

2. $y = -\dfrac{4}{5}^{x+1} - 2$

Point of inflection
(,   )

Horizontal asymptote
y=

3. $y = -\left(\dfrac{3}{4}\right)^{x-3} + 2$

Point of inflection
(,   )

Horizontal asymptote
y=

4. $y = 2\left(\dfrac{1}{2}\right)^{x-3} + 4$

Point of inflection
(,   )

Horizontal asymptote
y=

5. $y = 2\left(\dfrac{3}{2}\right)^{x-2} - 4$

Point of inflection
(,   )

Horizontal asymptote
y=

6. $y = -4 \cdot 2^{x+3} + 8$

Point of inflection
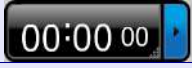(,   )

Horizontal asymptote
y=

ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity ICA: In Class Activity

ICA:

Just make sure you do the summary activity

MS 2 Week 2

Why and how are domain and range different for exponential functions and what letters help?

00:00 00

Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question

Week 2, Lesson 4

1. Warm-up
2. Domain and Range
   for Exponential Functions
3. ICA
4. Homework

Domain and Range
for Exponential Functions
Why and how are domain and range different for exponential functions and what letters help?
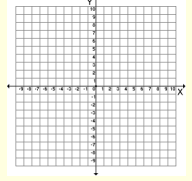
21

Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

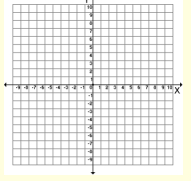Warm-up: **Graph the following.**

00:00 00

$$f(x) = -2\left(\frac{5}{2}\right)^{x+3} - 4$$

Point of inflection
(,)

Horizontal asymptote
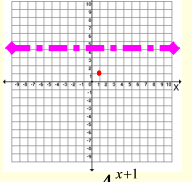y=

$$f(x) = -2\left(\frac{2}{5}\right)^{x+3} - 4$$

Point of inflection
(,)
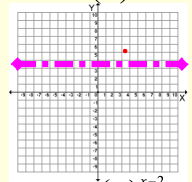
Horizontal asymptote
y=

Homework check

1. $y = -3(4)^{x-1} + 5$

Point of inflection
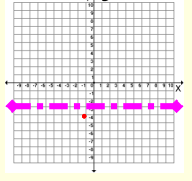(1, 2)

Horizontal asymptote
y= 5

4. $y = 2\left(\frac{1}{2}\right)^{x-3} + 4$

Point of inflection
(3, 6)
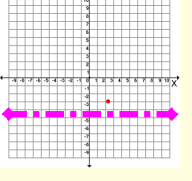
Horizontal asymptote
y= 4

2. $y = -\frac{4}{5}^{x+1} - 2$

Point of inflection
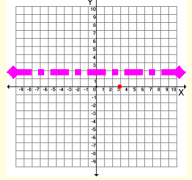(-1, -3)

Horizontal asymptote
y= -2

5. $y = 2\left(\frac{3}{2}\right)^{x-2} - 4$

Point of inflection
(2, -2)

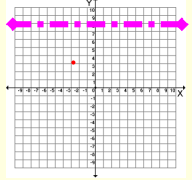Horizontal asymptote
y= -4

3. $y = -\left(\frac{3}{4}\right)^{x-3} + 2$

Point of inflection
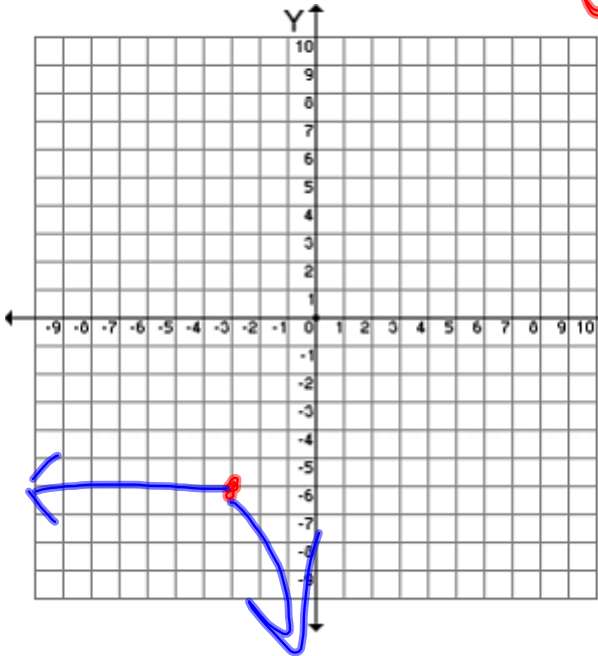(3, 1)

Horizontal asymptote
y= 2

6. $y = -4 \cdot 2^{x+3} + 8$

Point of inflection
(-3, 4)

Horizontal asymptote
y= 8

$$f(x) = -2\left(\frac{5}{2}\right)^{x+3} - 4$$

a (circled, red)
b (blue, over the 5)
growth

Point of inflection
$(-3, -6)$

Horizontal asymptote
$y = -4$

$$-2\left(\frac{5}{2}\right)^{-3+3} - 4$$
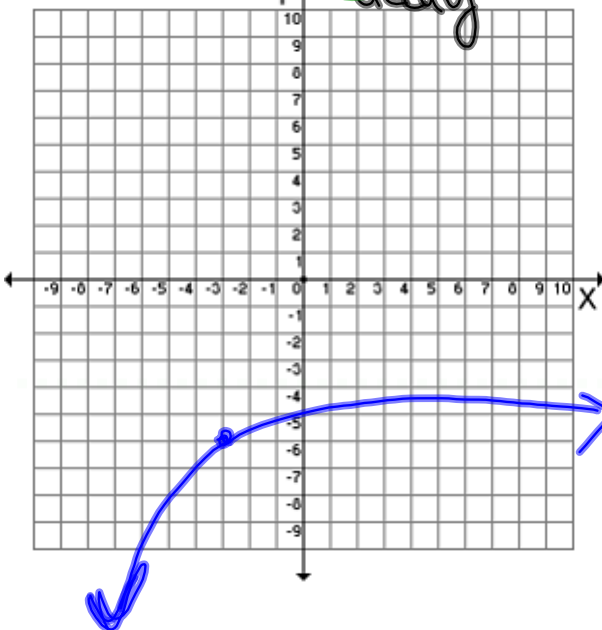
$$-2(1) - 4$$
$$-2 - 4$$
$$-6$$

$$f(x) = -2\left(\frac{2}{5}\right)^{x+3} - 4$$

a
decay

Point of inflection
$(-3, -6)$

Horizontal asymptote
$y = -4$
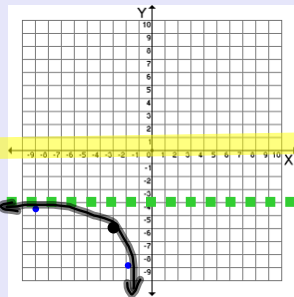

$$-2(1) - 4$$
$$-2 - 4$$
$$-6$$

Domain and Range
for Exponential Functions

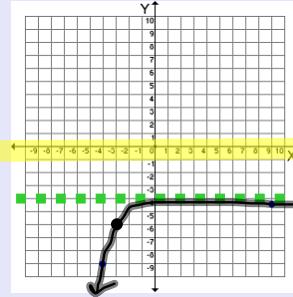| Standard 6.4 | Look at the bell work graphs. What is the domain of each and why. |

$$f(x) = -2\left(\frac{5}{2}\right)^{x+3} - 4$$

Point of
Inflection
(-3,-6)

Asymptote
-4

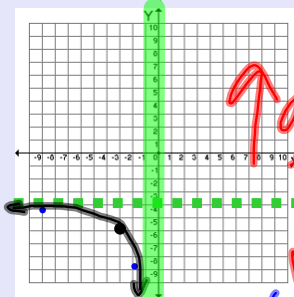$$f(x) = -2\left(\frac{2}{5}\right)^{x+3} - 4$$

Point of
Inflection
(-3,-6)

Asymptote
-4

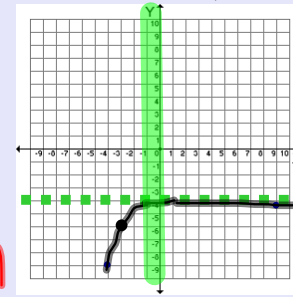What is the range of each and why.

$$f(x) = -2\left(\frac{5}{2}\right)^{x+3} - 4$$

Point of
Inflection
(-3,-6)

Asymptote
-4

greater than >

less than

$$y < -4 <$$

$$f(x) = -2\left(\frac{2}{5}\right)^{x+3} - 4$$

Point of
Inflection
(-3,-6)

Asymptote
-4

MS 2 Week 2

Tutoring/ Homework:

1. $y = -\left(\dfrac{3}{8}\right)^{x+2} + 7$

4. $y = 2 \cdot 3^{x+4} - 5$

2. $y = 3^{x-2} + 1$

5. $y = -4^{x+1} - 3$

3. $y = -2(.5)^{x-3} + 7$

6. $y = \dfrac{1}{2}(2)^{x+3}$

Domain

Range

Point of inflection
(,   )

Horizontal asymptote
y=

Domain

Range

Point of inflection
(,   )

Horizontal asymptote
y=

MS 2 Week 2

Right Side...

Write a summary that answers the essential question.

Left Side... Graph the following two equations. How do the domain and range compare and why?

$$y = -2(x-4)^2 + 3$$

$$y = -2(2)^{x-4} + 3$$

ICA:

Just make sure you do the summary activity

EQ

Week 7, Friday

1. Warm-up
2. Title
3. Homework

Title

EQ

PG

Warm-up: Answer the following questions.

Questions:

1. Who are you?

2. Do you have access to a graphing calculator?

3. What grades did you get in
   Alg 1 _____   Alg 2 _____
   Geo 1 _____   Geo 2 _____

4. Why are you here? For an education or to hang out?

Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure Closure

Right Side...

Write a summary that explains what you know about bell curves.

Left Side...

Complete the tutoring work.

1. $y = -\left(\dfrac{3}{8}\right)^{x+2} + 7$
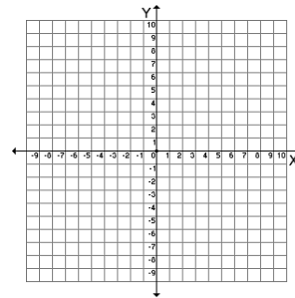
Domain

$\mathbb{R}$

Range

Point of inflection

(,)
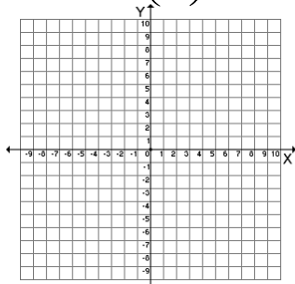
Horizontal asymptote

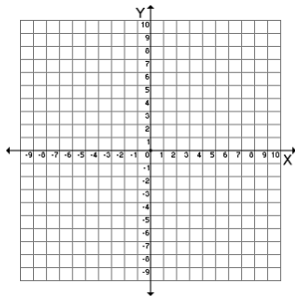y=

4. $y = 2 \cdot 3^{x+4} - 5$

Domain

$\mathbb{R}$

Range

Point of inflection

(,)

Horizontal asymptote

y=

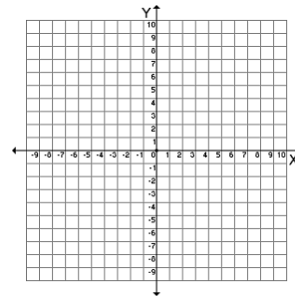**2.** $y = 3^{x-2} + 1$

Domain

$\mathbb{R}$

Range

Point of inflection

(,)

Horizontal asymptote

y=

5. $y = -4^{x+1} - 3$
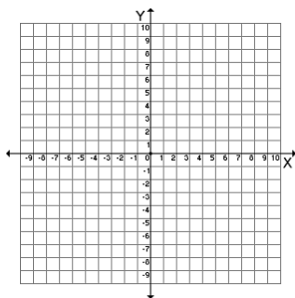
Domain

$\mathbb{R}$

Range

Point of inflection

(,)

Horizontal asymptote

y=

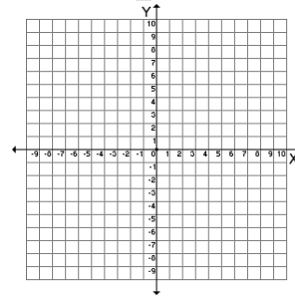**3.** $y = -2(.5)^{x-3} + 7$

Domain

$\mathbb{R}$

Range
$y < 7$

Point of inflection

(,)

Horizontal asymptote

y=

6. $y = \dfrac{1}{2}(2)^{x+3}$

Domain

$\mathbb{R}$

Range
$y > 0$

Point of inflection

(,)

Horizontal asymptote

y=

Attachments

1st exponetal homework.doc

2nd exponetal homework.doc

3rd exponental homework.doc

week 2 Lesson 1 activity.doc