

GRAPHING EXPONENTIALS

WARM-UP (THURSDAY)

agenda

Warm-Up

Notes

HW:

Practice (#1-6)

REMINDERS

HW 5.6 Due Friday

1. Complete the table below based on the pattern.

Stage 1 Stage 2 Stage 3

x	y
0	2 $\rightarrow 2 \times 2$
1	4 $\times 2$
2	8 $\times 2$
3	16 $\times 2$
4	32
5	64

How many blocks would be needed for the 5th stage?

64 blocks

GRAPHING EXPONENTIALS

Fold notes in half, glue blank side on page

1. Complete the table of values below and graph the following functions.

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

x	f(x)
-2	-11
-1	.33
0	1
1	3
2	9
3	27

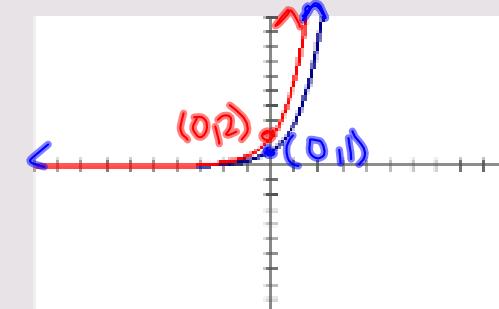
Exponential Function:

$$y = a \cdot b^x$$

scale factor
y-intercept

base
multiplier

NORMAL FLOAT AUTO REAL DEGREE MODE



$$f(x) = 2 \cdot 3^x$$

x	f(x)
-2	.22
-1	.67
0	2
1	6
2	18
3	54

A line that continually approaches a graph but never reaches it is known as an Asymptote.

2.

Is $f(x)$ an increasing or decreasing function?

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

increasing

$$f(x) = 2 \cdot 3^x$$

increasing

y-intercept

#

(0,1)

Asymptote ($y =$)

$y = 0$

(0,2)

Domain of the function

(x-values)
(y-values)

All real #s

All real #s

Range of the Function

$y > 0$

$y > 0$

GRAPHING EXPONENTIALS



3. What are the similarities of the functions $f(x) = 3^x$ and $f(x) = 2 \cdot 3^x$? Differences?

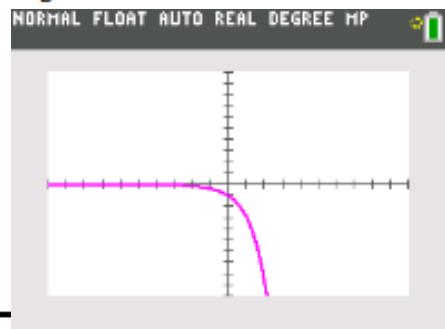
similarities

①
②

difference

①

4. Predict what would happen if you graphed the function $y = -3^x$. Graph the equation and describe the effect of a negative value for a. Is the function increasing or decreasing?



- graph reflected
 - decreasing
- $y < 0$

GRAPHING EXPONENTIALS

5. Complete the table of values below and graph the following functions.

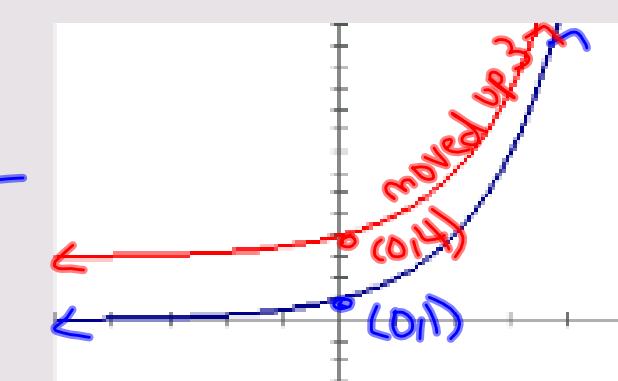
Complete the table of values below for the functions.

$$\text{TM } f(x) = 2^x$$

NORMAL FLOAT AUTO REAL DEGREE HP

$$f(x) = 2^x + 3 \text{ TM}$$

x	f(x)
-2	.25
-1	.5
0	1
1	2
2	4
3	8



x	f(x)
-2	3.25
-1	3.5
0	4
1	5
2	7
3	11

6.

Is $f(x)$ an increasing or decreasing function?	$f(x) = 2^x$	$f(x) = 2^x + 3$
y-intercept	Increasing (0,1)	Increasing (0,4)
Asymptote ($y = \underline{\hspace{2cm}}$)	$y=0$	$y=3$
Domain of the function	\mathbb{R}	\mathbb{R}
Range of the Function	$y > 0$	$y > 3$

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

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

Increasing
(0,1)

$$y=0$$

$$\mathbb{R}$$

$$y>0$$

Increasing
(0,4)

$$y=3$$

$$\mathbb{R}$$

$$y>3$$

GRAPHING EXPONENTIALS

7. What are the similarities of the functions $f(x) = 2^x$ and $f(x) = 2^x + 3$? Differences?



graph shifts up

8. What effect does an asymptote have on the y-intercept?

9. Describe the relationship between the range and the asymptote of an exponential function?

Same, different equality symbols
= > <

GRAPHING EXPONENTIALS

Summary (outside of notes)

$$y = a \cdot b^x$$

b Increasing/Decreasing	$0 < b < 1$	$b > 1$	
a How does it compare to b^x?	$0 < a < 1$	$a > 1$	$a < 0$

Algebra I Unit 9 Exponential Functions

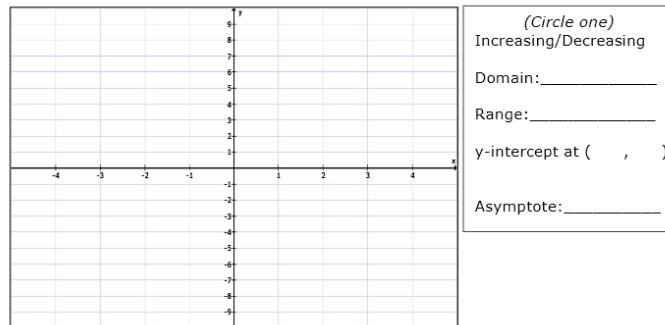
Student Practice – Graphing Exponential Functions

Name _____ Date _____ Period _____

Plot the following points to graph each function and its asymptote. Identify the characteristics of each.

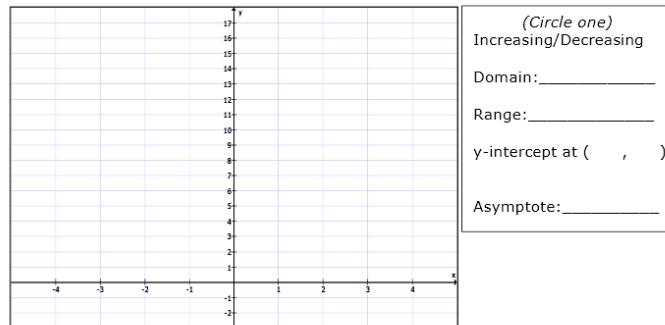
1. $y = 3 \cdot 2^x$

X	Y
-2	
-1	
0	
1	
2	
3	



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

X	Y
-2	
-1	
0	
1	
2	
3	

3. Which function is **not** decreasing?

A. $f(x) = -(3)^x$

C. $f(x) = \frac{1}{4}(2)^x$

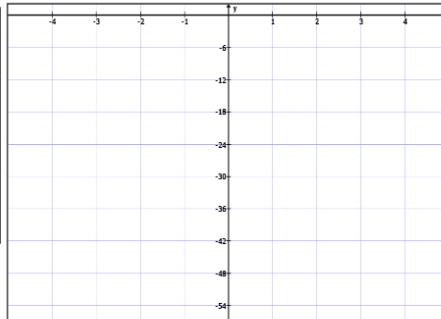
B. $f(x) = 2\left(\frac{1}{6}\right)^x$

D. $f(x) = \frac{2}{3}\left(\frac{1}{6}\right)^x$

Algebra I Unit 9 Exponential Functions

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

x	y
-2	
-1	
0	
1	
2	
3	



(Circle one)
Increasing/Decreasing

Domain: _____

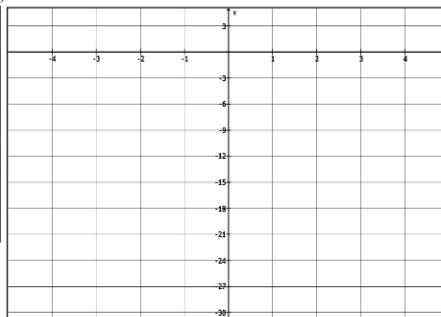
Range: _____

y-intercept at (,)

Asymptote: _____

5. $f(x) = -2 \cdot (0.25)^x + 3$

x	y
-2	
-1	
0	
1	
2	
3	



(Circle one)
Increasing/Decreasing

Domain: _____

Range: _____

y-intercept at (,)

Asymptote: _____

6. Given the equation $f(x) = a \cdot (5)^x$, what value(s) of a will make the graph increase at a slower rate?

- A. $a < 0$ B. $0 < a < 1$ C. $a > 1$ D. None of these

GRAPHING EXPONENTIALS

Homework Help!

Use your calculator to complete the table, then use your graph to answer the questions. If a graph is going DOWN, it is decreasing and if it is going UP, it is increasing! Your range & asymptote should use the same y-value.

1. $\{0.75, 1.5, 3, 6, 12, 24\}$; Increasing; {D: All Real #'s}; {R: $y > 0$ }; (0,3); $y = 0$.
2. $\{14, 6, 2, 0, -1, -1.5\}$; Decreasing; {D: All Real #'s}; {R: $y > -2$ }; (0,2); $y = -2$.
3. C
4. $\{-0.222, -0.666, -2, -6, -18, -54\}$; Decreasing; {D: All Real #'s}; {R: $y < 0$ }; (0,-2); $y = 0$.
5. $\{-29, -5, 1, 2.5, 2.875, 2.968\}$; Increasing; {D: All Real #'s}; {R: $y < 3$ }; (0,1); $y = 3$.
6. B

