

Warm Up

2/5/19

1. The sum of 3 times a number and 5 is 2 times the number plus 15. What is half the number?

2. What is the value of x in the equation $f(x) = \frac{x}{2} + 5$, if the value of $f(x) = 8$?

3. A rectangle has a perimeter of 24 units. The length of the rectangle is 2 times 3 less than the width. What is the width of the rectangle?

Exponential Functions

Intro to Exponential Functions

An exponential function is a form of a geometric sequence.

A function in which the variable is the exponent is called an exponential function.

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

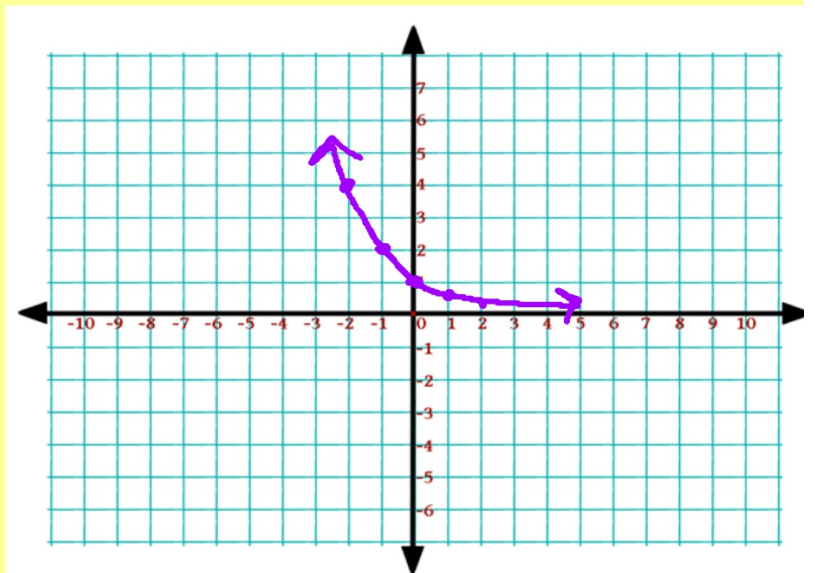
a = y-intercept (when there is no shift)

b = common ratio, base

Make a graph using a table

$$y = (1/2)^x$$

x	y
-2	4
-1	2
0	1
1	1/2
2	1/4



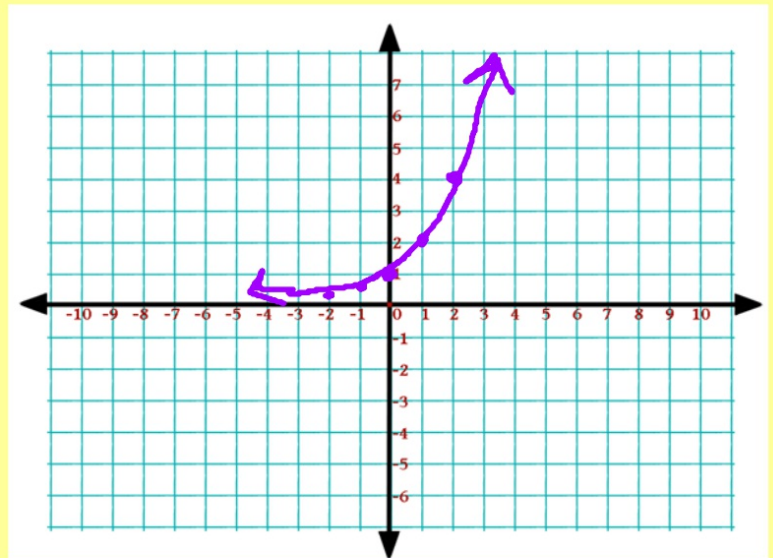
y-int: 1

base: 1/2

Make a graph using a table

$$y = 2^x$$

x		y
-2		$\frac{1}{4}$
-1		$\frac{1}{2}$
0		1
1		2
2		4



y-int: 1-----

base: 2-----

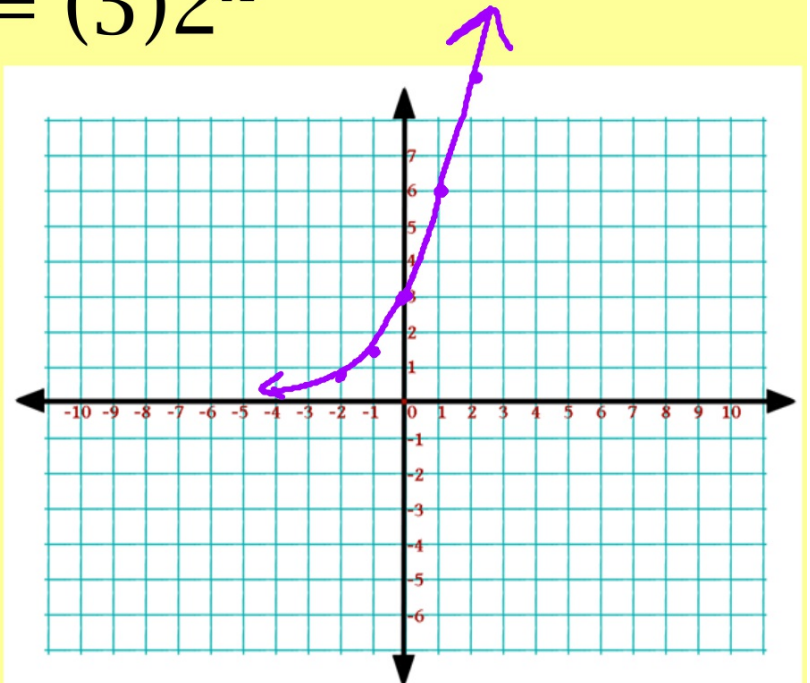
Make a graph using a table

$$y = (3)2^x$$

x		y
-2		$3/4$
-1		$3/2$
0		3
1		6
2		12

y-int: 3

base: 2



Find the y-intercept of the exponential functions.

$$\text{A.) } y = 3(.75)^x$$

y-intercept = 3

$$\text{C.) } y = 2(1.05)^x - 4$$

$2(1) - 4$
 $2 - 4$
y-intercept = -2

$$\text{B.) } y = 0.5(1.04)^x$$

y-intercept = 0.5

$$\text{D.) } y = .80^x - 3$$

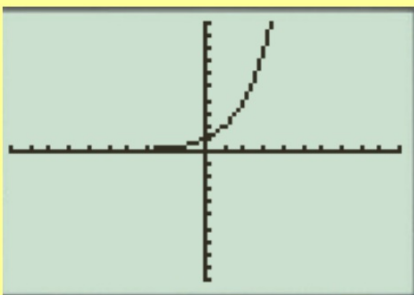
$1 - 3$
y-intercept = -2

Hint: Exercises C and D have shifts.
Y-intercept is value of y when $x = 0$

What does it mean when an exponential function has a shift?

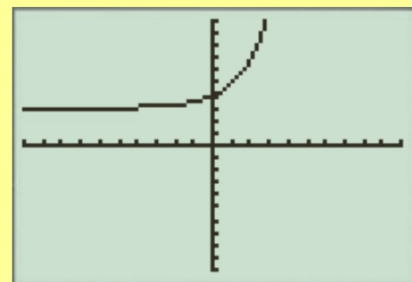
An exponential function in the form $f(x) = a(b)^x + k$ has a vertical shift.

The constant, k , is what causes the shift to occur.



$$y = 2^x$$

(0,1)



$$y = 2^x + 3$$

(0,4)

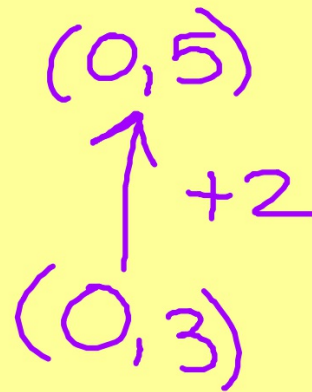
***Notice the y-intercepts.**

Ex.) The function $f(x) = 3(2)^x$ was replaced with $f(x) + k$ so that the y-intercept became $(0,5)$. What is the value of k ?

$$a = 3, b = 2$$

$$\text{y - int: } (0,3)$$

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

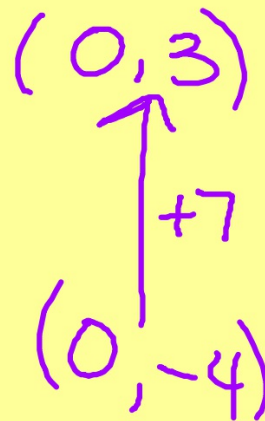


Ex.) The function $f(x) = -4(3)^x$ was replaced with $f(x) + k$ so that the y-intercept became $(0,3)$. What is the value of k ?

$$\text{y-intercept} = -4$$
$$(0, -4)$$

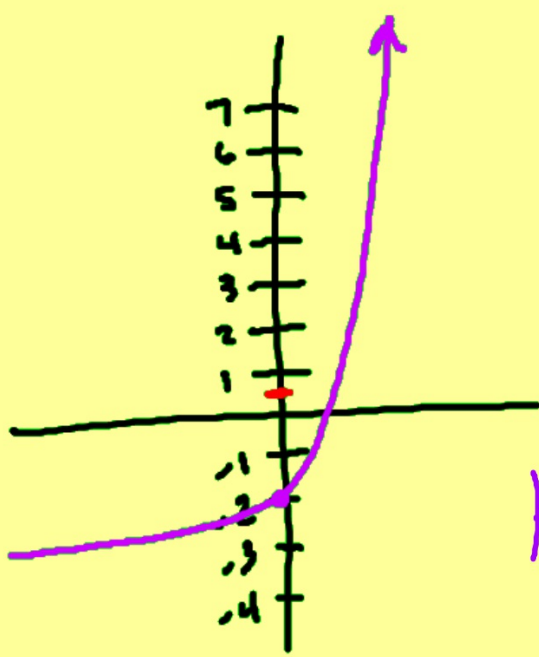
$$k = 7$$

$$f(x) = -4(3)^x + 7$$



Ex.) The function $f(x) = 0.5(1.5)^x$ was replaced with $f(x) + k$, as graphed below. What is the value of k ?

$$y\text{-incept} = 0.5$$



$$(0, 0.5)$$

$$-2.5$$

$$k = 2.5, -2$$