Graphs of Exponential Equations Exploration

Part 1 8-7 page 430

(a) $y = a \cdot b^x$ is the **general form** for an Exponential Eq. or Exponential Fucntion

(b) What are the allowed values for

x : Any real number

a : $a \neq 0$

b : $b>0$ and $b \neq 1$

Part 2 8-8 page 437

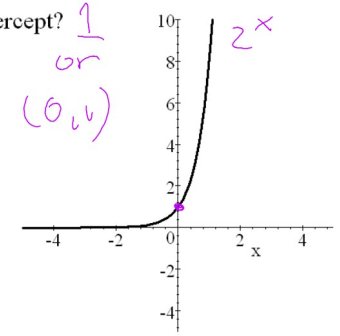
b is the **base** of this function. When $b > 1$ the equation $y = a \cdot b^x$ models Exponential Growth

and b is called the Growth Factor

Part 3 Graphing Calculator Exercises

A) Use a graphing calculator and graph $Y_1 = 2^x$

B) What is the y-intercept? 1 or (0,1)



2^x

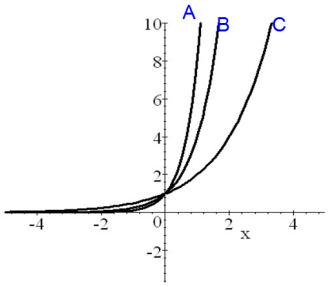
$y = 2^0 = 1$

C) In Y_2 and Y_3 graph $y = b^X$ for two other values of b bigger than 2, such as $Y_2 = 4^x$ and $Y_3 = 8^x$

$Y_1 = 2^X$ C

$Y_2 = 4^x$ B

$Y_3 = 8^x$ A



E) What happens to the graphs as b increases?

As the base increase the graph grows faster

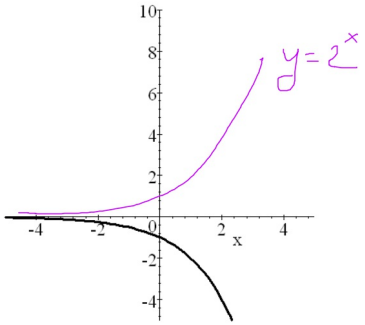
F) What point do all three graphs have in common?

The same y-intercept (0,1)

D) Now graph $y = a \bullet 2^X$ for a negative value of a. What does this do to the graph?

$y = -1 \bullet 2^X$

It's a reflection of $y=2^x$ over the x-axis (it's upside down)



Part 4

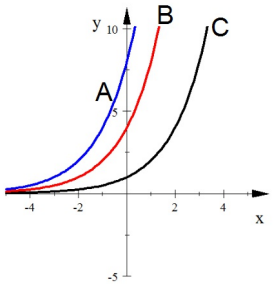
A) Leaving $Y_1 = 2^x$ (this is where $a = 1$ & $b = 2$) Graph in Y_2 and Y_3 $y = a \cdot 2^x$ for 2 other positive values of a.
For example, graph $Y_2 = 4 * 2^x$ and $Y_3 = 8 * 2^x$

B) Make a sketch of all three graphs, labelling each graph with it's equation.

$Y_1 = 2^x$ C

$Y_2 = 4(2)^x$ B

$Y_3 = 8(2)^x$ A



C) Explain what changing the value of a does to the graph.

The value of a represents the y-intercept of the graph.

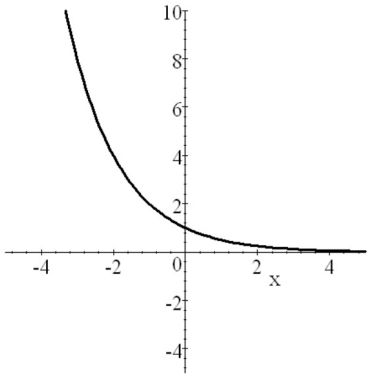
Part 5 Sec 8-8 page 440

A) When the value of b is between 0 and 1, $0 < b < 1$,

then the equation $y = a \bullet b^X$ models Exponential Decay

and b is called the Decay Factor

B) Graph $Y_1 = 0.5^X$



C) Describe how this graph is different from the graphs in Part 3.

The graph decreases as you move to the right. It's also a reflection of $y = 2^x$ over the y-axis

$y = a(b)^x$

y= amount at the end

a = the y-intercept of the graph or the original amount.

b = the Growth Factor if b>1
the bigger b gets the faster the graph grows

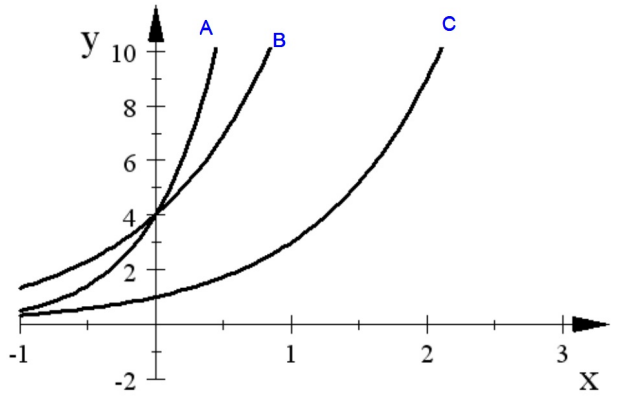
or

the Decay Factor if 0<b<1
the smaller b gets the faster the graph decays

Match each equation to it's graph

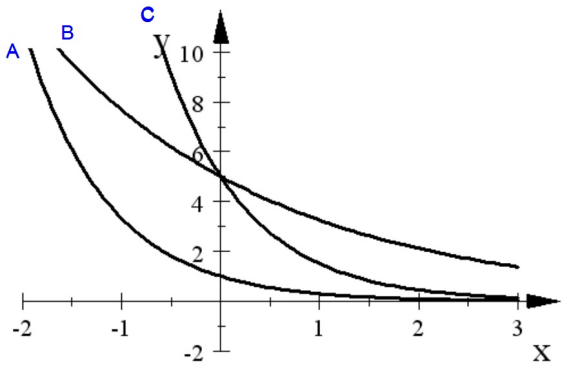
ActivExpression

1. $y = 3^x$ C
2. $y = 4 \cdot 3^x$ B
3. $y = 4 \cdot 8^x$ A



Match each equation to it's graph

1. $y = (0.3)^x$ A
2. $y = 5(0.3)^x$ C
3. $y = 5(0.65)^x$ B



The **smaller** the base....the faster the graph decays!

The closer the base is to 1 the

flatter the graph.

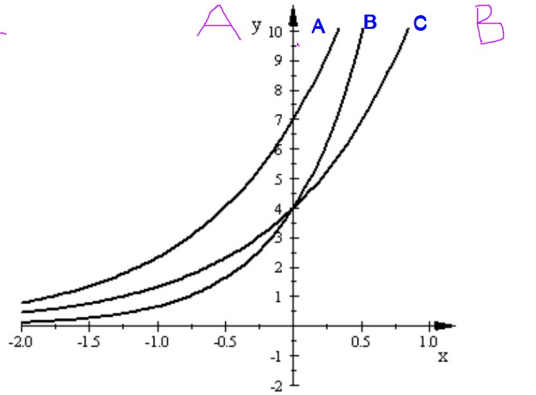
Does each exponential equation represent growth or decay?

A = Growth B = Decay

1. $y = 4500(0.9983)^x$ decay
2. $y = 0.045(1.00201)^x$ growth
3. $y = 7\left(\frac{12}{13}\right)^x$ decay
4. $y = 12.06\left(\frac{42}{39}\right)^x$ growth
5. $y = 145(1.33)^{-x}$ decay

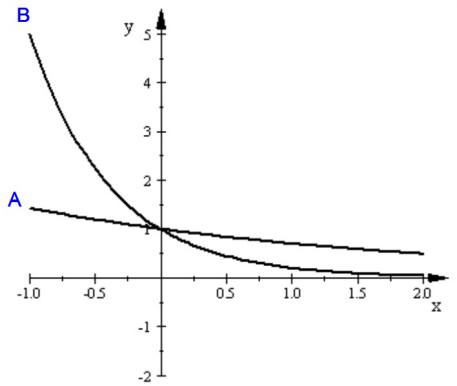
Match each equation with its graph

1. $y = 4(3)^x$ C
2. $y = 7(3)^x$ A
3. $y = 4(6)^x$ B



Match each equation with its graph

1. $y = (0.2)^x$ B
2. $y = (0.7)^x$ A



A. $y = 5000(1.209)^x$ B. $y = 4.02(1.0998)^x$ C. $y = 12(1.210001)^x$

Which is these exponential functions is the steepest? (grows the fastest)

C

Which is these exponential functions is the flatest? (grows the slowest)

B

t

A. $y = 52.8(0.757)^x$ B. $y = 1033(0.924)^x$ C. $y = 4.5(0.106)^x$

Which is these exponential functions is the steepest? (decays the fastest)

C

Which is these exponential functions is the flatest? (decays the slowest)

B

Find the y-intercept for each:

1. $y = 12(0.105)^x$

y-int = 12

2. $y = 5.7(1.62)^x$

y-int = 5.7

3. $y = 8^x$

y-int = 1