

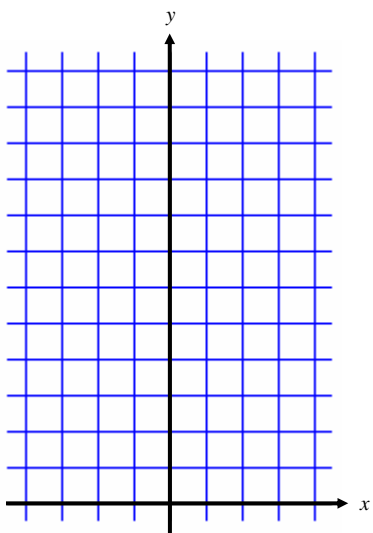
3.3 GRAPHS OF EXPONENTIAL FUNCTIONS

Example: Graph each of the following equations on the graphs provided by making a table of values.

DO NOT use a calculator.

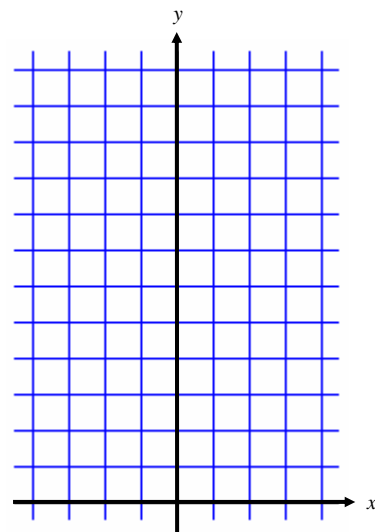
a) $y = 2^x$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



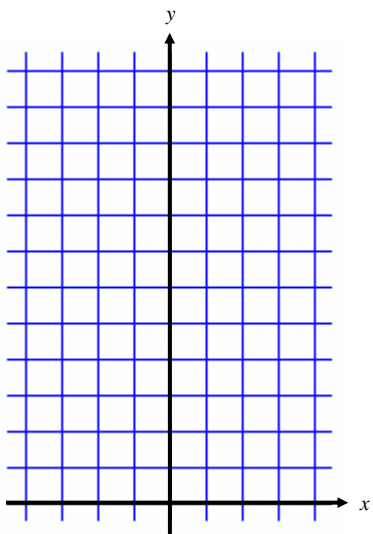
b) $y = 3 \cdot 2^x$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



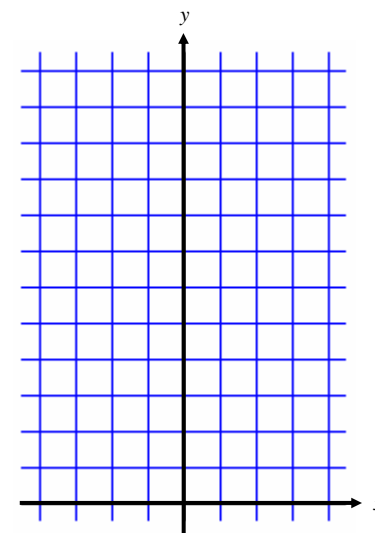
c) $y = (\frac{1}{2})^x$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



d) $y = 3 \cdot (\frac{1}{2})^x$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



Example: Which of these graphs show growth? decay?

Example: How does the 3 in the equations above affect the graph?

Example: What is the domain and range of all 4 graphs?

Exponential Growth and Decay Functions

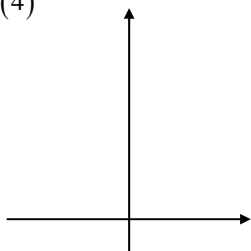
The equation of an exponential growth or decay function is _____.

The a value is the _____ of the graph.

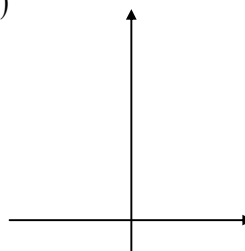
The equation is growth if _____, and decay if _____.

Example: Sketch a graph of each of the following equations. Label the y -intercept.

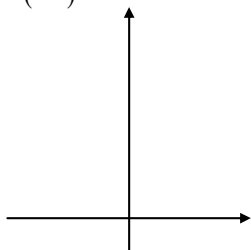
a) $y = 27(4)^x$



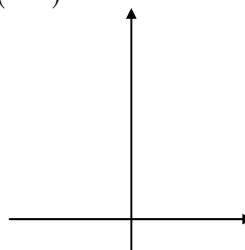
b) $y = 25(.75)^x$



c) $y = 1500(.25)^x$



d) $y = 25000(1.05)^x$

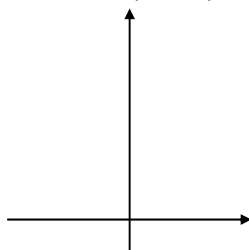
*Using a Graph to Solve Equations*

When you graph two different functions on the same graph, the _____ of the two graphs shows where the two graphs are the equal.

Example: Solve the equation $3x - 6 = 2x + 5$ graphically using your graphing calculator.

Example: Consider the equation $25 = 10(1.07)^x$.

a) Let $y_1 = 25$ and $y_2 = 10(1.07)^x$. Sketch both y_1 and y_2 on the axis below.



b) In order to use your calculator to solve this problem, you have to see the intersection on the screen. What should the Y_{min} and Y_{max} equal in order for you to see this graph on your screen?

c) Use your calculator to solve the original equation.

Example: The radioactive isotope Germanium – 71 decays at a rate of 4.5% per day. A scientist started her experiment with 25 grams.

- a) Write an equation that models this situation. Explain what each variable represents.
- b) According to your equation, how much is left after 1 week?
- c) According to your equation, how much was around 4 days before the scientist started this experiment?
- d) Using your equation, how long will it take for there to be 20 grams?
- e) Using your equation, how long will it take for half of the sample to remain?

Example: When you earn interest or borrow money, banks are required to give you an Annual Percentage Rate, or APR. This is the amount of interest you would receive (or pay) on your money at the end of 1 year. Suppose you were to invest \$8000 into an account with an APR of 6%.

- a) Write an equation that models this situation.
- b) According to your equation, how much money will you have in 5 years?
- c) According to your equation, how long will it take for your money to double?
- d) According to your equation, how long will it take for you to earn \$1,000,000?