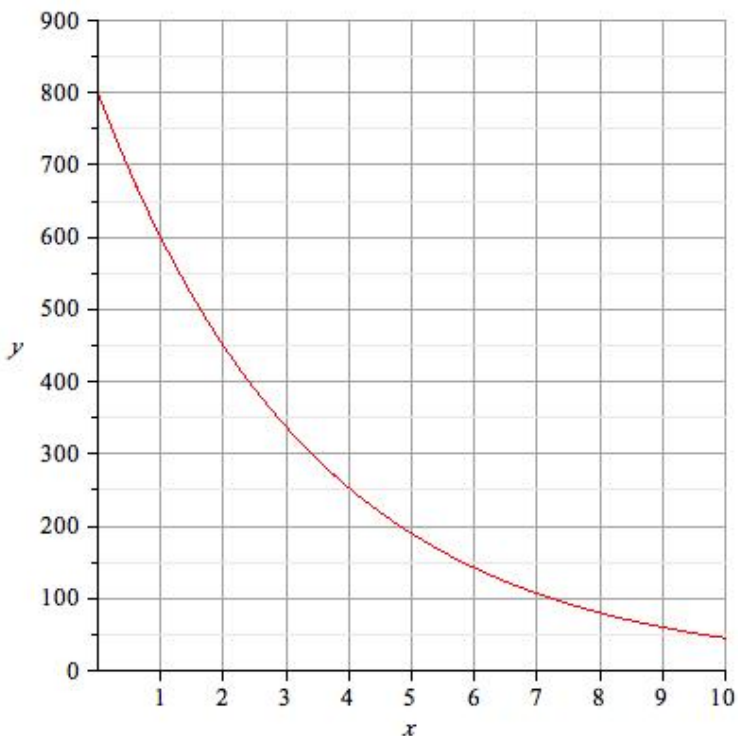
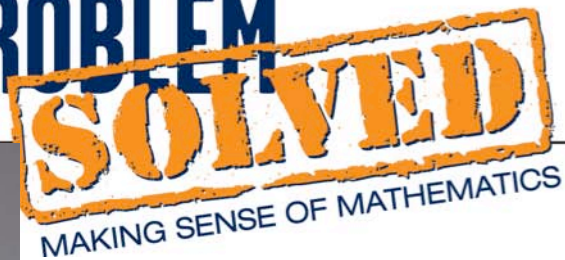


After watching the video, *Exponential Decay*, complete the following problems.

1. The following is a graph of $y = a(1-r)^x$. Find a , r (the decay rate) and the decay factor.



2. The video used the equation $y = a(1-r)^x$. An equivalent equation $y = ab^x$ where $b = 1-r$ is frequently used as well. Use a graphing calculator or computer to investigate changes in the graph.
- Let $a = 1$ and $0 < b < 1$ and predict what will happen to a graph when the value of b changes. Try at least four different values for b .
 - Let $a > 1$ and $b = 0.5$ and predict what will happen to a graph when the value of a changes. Try at least four different values for a .



- c. Let $b = 0.5$ and predict what will happen to a graph when the value of a is negative. Try several different values for a .
- d. Let $a = 1$ and predict what will happen to a graph when the value of b is negative. Try several different values for b .
3. When we learn a list of data, such as vocabulary words in another language, it is theorized that our memory decays exponentially over time unless we continually practice. Assume Mia learned 100 words and knew them all when it was time to be tested. Further, assume that she only knew 95 words one month later.
- a. How many words did she know one year later?
- b. How many words did she know two years later?
- c. How long did it take before she remembered only one word?