Exponentials

The following processes are exponential.

1. The back of the old refrigerator
   (a) Lackadaisical Larry finds 1 gram of mold in a dish in the back of his refrigerator on November 1st. How much mold is there?
   (b) By November 2nd the amount of mold has doubled. How much mold is there?
   (c) The mold continues to double each day. Fill out a table showing the amount of mold through November 4th.
   (d) If this pattern has always worked how much mold was there on October 31st? October 30th?

2. In the abandoned pantry
   (a) Lackadaisical Larry finds 1 gram of mold in a container in the back of his pantry on November 1st. How much mold is there?
   (b) By November 2nd the amount of mold has tripled. How much mold is there?
   (c) The mold continues to triple each day. Fill out a table showing the amount of mold through November 4th.
   (d) If this pattern has always worked how much mold was there on October 31st? October 30th?

3. Expiration date
   (a) Forgetful Frank places 1 gram of active yeast in water to bloom. How much yeast is there?
   (b) After one hour only half of the yeast is still alive. How much yeast is there?
   (c) Half of the yeast continues to die each hour. Fill out a table showing the amount of yeast for the next 3 hours.

4. Expiration date 2
   (a) Forgetful Frank places 1 gram of active yeast in water to bloom. How much yeast is there?
   (b) After one hour only a third of the yeast is still alive. How much yeast is there?
   (c) Suppose that after each hour a third of the yeast is still alive. Fill out a table showing the amount of yeast for the next 3 hours.

5. Analyze
   (a) Graph the following functions. You can graph them on the same axes if you like.
      \( y = 2^x, \ y = 3^x, \ y = 4^x. \)
   (b) How do the curves change as the base (2, 3, or 4) increases? What would \( y = 5^x \) look like? (Do not graph it.)
   (c) Graph \( y = \left( \frac{1}{2} \right)^x \).
   (d) Compare the graphs of \( y = 2^x \) and \( y = \left( \frac{1}{2} \right)^x \).
   (e) All of these are exponential functions. Describe the shape of the graph of an exponential function in words.