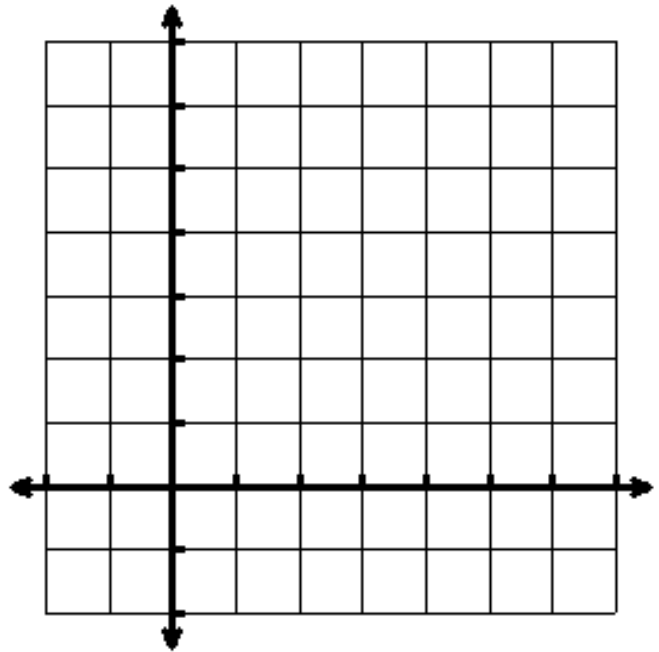


8-7 Exponential Growth and Decay

While listening to *One Grain of Rice*, fill in the following spreadsheet and graph, using an appropriate scale to determine a function for the amount of rice the Raja will receive.

Days	Rice
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

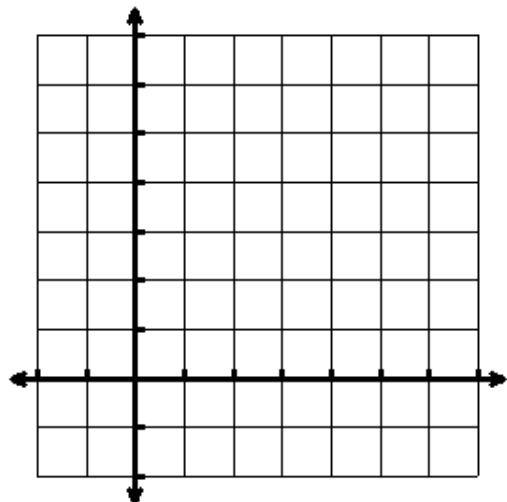


For exponential functions, the general formula that we use is:

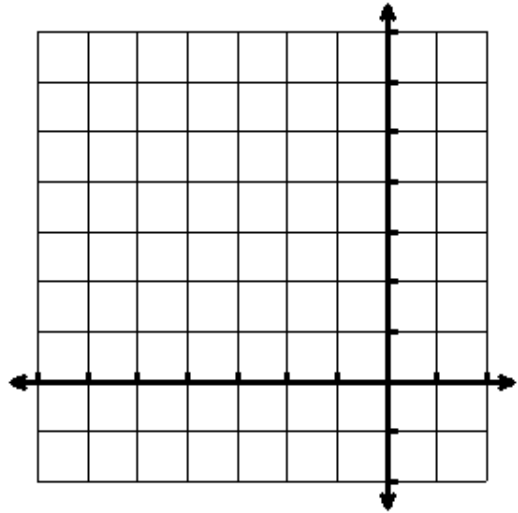
$$y = a \cdot b^x$$

Lets graph! Can you identify the difference between the next two graphs?

1. Graph $y = 3 \cdot 2^x$



2. Graph $y = 3 \bullet 0.5^x$



Exponential Growth: the graph will GROW when _____

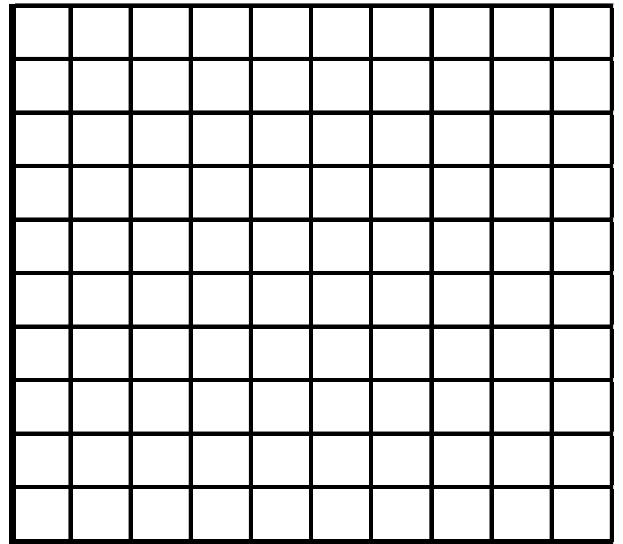
Exponential Decay: the graph will DECAY when _____

Let's Try one last Problem:

3. Jessica's parents decided to open up a savings account when Jessica was born. They deposited \$50 to open the account and asked the banker how fast the money would grow with interest. The banker replied, "the money will grow according to the exponential function below, with x representing the number of years the money will be left in the bank."

$$y = 50 \bullet 1.075^x$$

a. How much money will Jessica have in her account after 30 years?



b. Graph the function from 0 to 50 years.

c. Does this model exponential growth or decay? Explain.

Determine whether each situation represents exponential GROWTH or DECAY.

1. $y = 10 \bullet .975^x$

2. $y = 4^x$

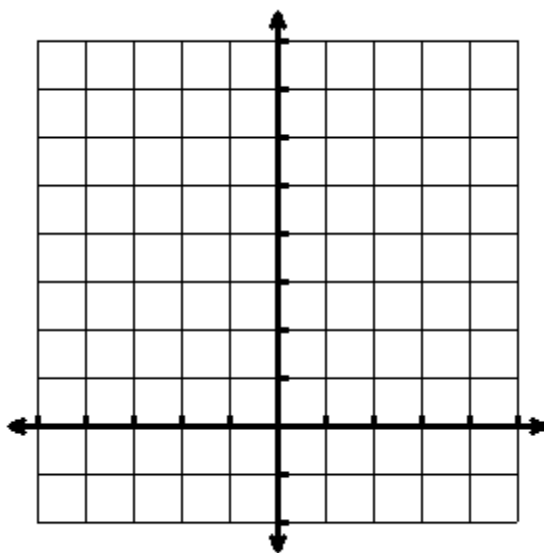
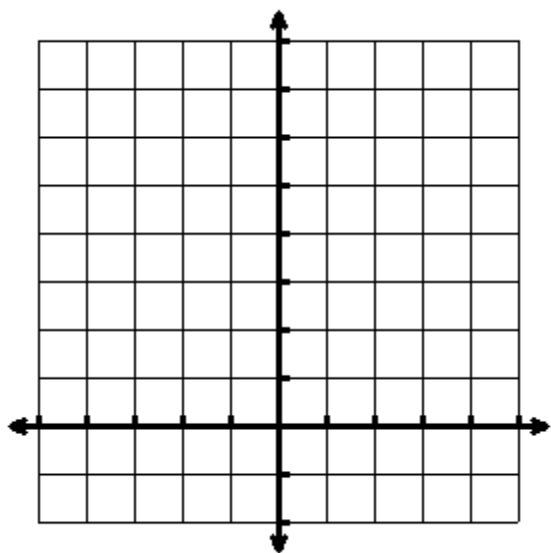
3. $y = 2 \bullet 1.0025^x$

4. A coin collection costs \$215 and increases in value by 2.4% per year.

5. A supermodel's wardrobe costs \$11,700 and decreases in value by 16% per year.

6. Graph: $y = 1.5^x$ over
the interval $-2 \leq x \leq 4$

7. Graph: $y = 2 \bullet .75^x$ over
the interval $-4 \leq x \leq 3$



8. Suppose 10 animals are taken to an island, and then the population of these animals quadruples every year. Write an exponential function and determine how many animals there would be in 6 years.