EXPONENTIAL GROWTH & DECAY – Day 1
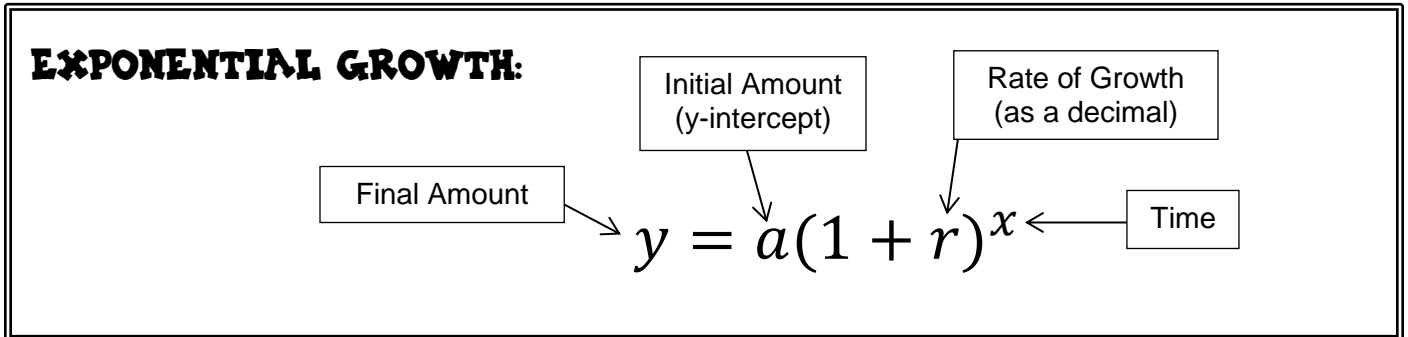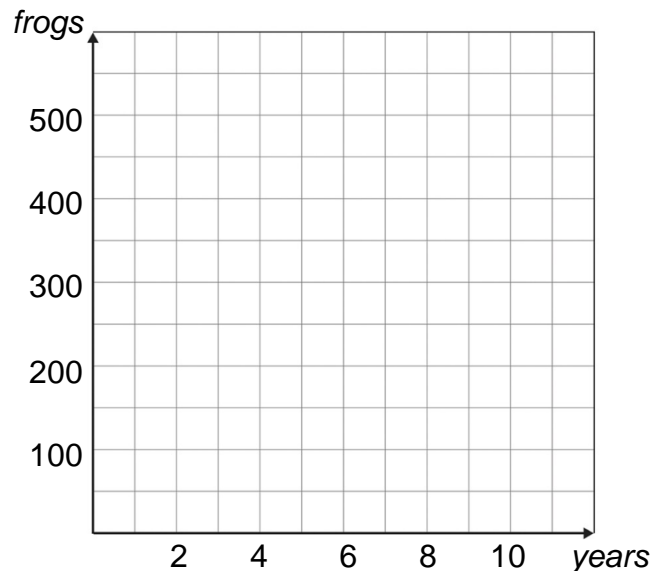
Exponential Growth occurs when a quantity _____ by the same factor over equal intervals of time.

EXPONENTIAL GROWTH:

Initial Amount (y-intercept)

Rate of Growth (as a decimal)

Final Amount

Time

$$y = a(1 + r)^x$$

Example 1: A population of 100 frogs increases by 20% every year.

A) Write an exponential function that represents the number of frogs, y, after x years.

B) How many frogs will there be in 5 years?
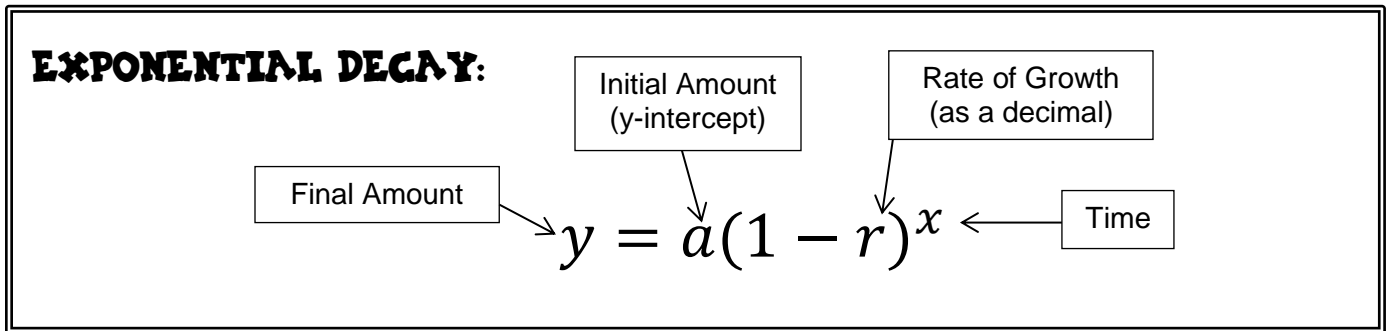
C) Sketch a graph of the relationship.

frogs

500

400

300

200

100

2   4   6   8   10   *years*

Example 2: Your starting annual salary at a company is $30,000. The company awards an annual increase of 4.5%.

A) Write an exponential function that represents your salary, y, after x years.

B) What will your salary be in 10 years?

C) When will your salary be more than $60,000?

Exponential Decay occurs when a quantity _____ by the same factor over equal intervals of time.

EXPONENTIAL DECAY:

| Initial Amount (y-intercept) | | Rate of Growth (as a decimal) |

Final Amount
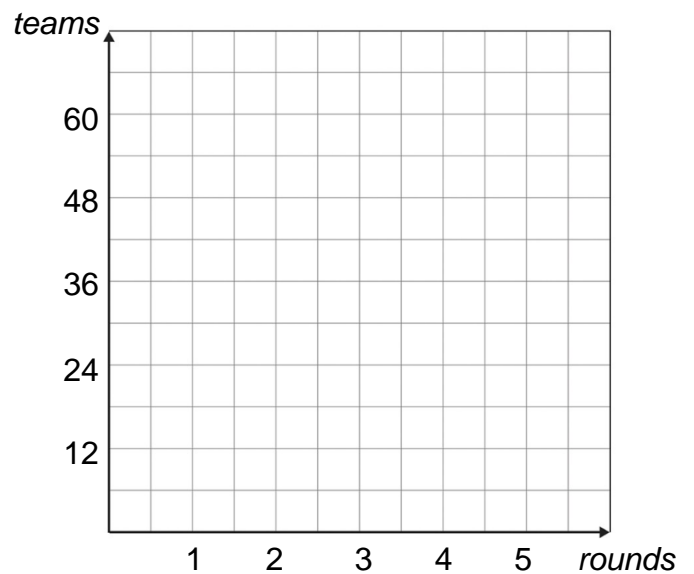
$$y = a(1 - r)^x$$

Time

Example 3: In the NCAA basketball championship (also known as March Madness), teams play against each other with only the winning teams progressing to the next round. In other words, after each round, half of the teams are eliminated.

A) If play begins with 64 teams, write a function that represents the number of teams remaining, y, after x rounds.

B) How many teams remain after 4 rounds?

C) Sketch a graph of the relationship.

teams

60

48

36

24

12

1   2   3   4   5   *rounds*

Example 4: The value of a car is $35,000. It depreciates 10% in value each year.

A) Write a function that represents the value of the car, y, after x years.

B) What will the value of the car be after 10 years?

C) When will the value of the car be less than $10,000?