Exponential (Growth/Decay) Feb 7

Exponential Function Form

$$Y = ab^x$$

Exponent of x make this an exponential function

Y-intercept at (0, a)

Growth or Decay

a = Initial Value   (b = 1 ± rate(r) *express as a decimal*)

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1) Change the following percent to decimals:

   a. 33% = _____   d. 1.5% = _____

   b. 15% = _____   e. 100 % = _____

   c. 50% = _____   f.   25% = _____

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2) Alice's height doubles each time she eats an ounce of cake (increases by 100%).

    a) Express the **rate (r)** of 100% as a decimal = _____

    b) Find the **Growth Factor (b = 1 + rate (r))** = _____

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3) Alice's height is cut in half each time she drinks an ounce from the bottle (decreases by 50%).

    a) Express the **rate (r)** of 50% as a decimal = _____

    b) Find the **Decay Factor (b = 1 – rate (r))** = _____

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4) Every day you forget a third (33%) of the material you learn in Algebra.

    a) Express the **rate (r)** of 33% as a decimal = _____

    b) Find the **Growth**   **/Decay Factor (b) =** _____

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5) Rabbits' populations increase by 25% each year. Find the rate of change.

    a) Express the **rate (r)** of 25% as a decimal = _____

    b) Find the **Growth/Decay Factor (b) =** _____

6) The population of rabbits *increases* at a rate of 25% per year. You have counted 40 rabbits in your uncle's farm.

    a) Determine the **growth or decay factor (b)**, **the rate (r)**, and **the initial count (a)**.

    a = _____   r = _____   b = (1 + r) = _____

    b) Write a function that models the change in the rabbits' population for any year.

    c) Graph the function and estimate the number of years until the rabbits' population will multiply 3 times.

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7) The world population of tigers in 2000 was approximately 3,125. The annual rate of *decrease* was about 15% per year.

a) Determine:

    a = _____   rate = _____   b = _____

b) Do we have a *growth or decay factor*? Identify it.

c) Suppose the rate of *decrease* continues to be 12% per year. Write a function to model the world population of tigers for any given year.

c) Graph the function. Estimate the number of years until the population will reduce approximately one fifth.