Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Exponential and Logarithm Application Practice**

1. A bank account balance, *b,* for an account starting with *s* dollars, earning an annual interest rate, *r,* and left untouched for *n* years can be calculated as  http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec46.gif*(an exponential growth formula).*   Find a bank account balance to the *nearest dollar*, if the account starts with $100, has an annual rate of 4%, and the money left in the account for 12 years.

|  |  |
| --- | --- |
| 1. **Exp. Growth** http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/cellphone.gif | In 1985, there were 285 cell phone subscribers in the small town of Centerville.  The number of subscribers **increased** by 75% per year after 1985.  How many cell phone subscribers were in Centerville in 1994? (Don't consider a fractional part of a person.) – **Fill in the table below.** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Years | *x* = 1 1986 | 2 1987 | 3 1988 | 4 1989 | 5 1990 | 6 1991 | 7 1992 | 8 1993 | 9 1994 |
| Number of  Cell Phone users |  |  |  |  |  |  |  |  |  |

**There are \_\_\_\_\_\_\_\_\_\_\_\_ subscribers in 1994.**

**Write the function that models the situation.**

|  |  |
| --- | --- |
| Function: | *a* = the initial amount before the growth begins *r* = growth rate *x* = the number of intervals |
|  | as *x* ranges from 1 to 9 for this problem |

Now, perform a regression on your calculator:

|  |  |
| --- | --- |
| [http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/84seblank.gif](http://mathbits.com/MathBits/TISection/statistics1/scatterplot.htm) | See how to prepare a scatter plot of your data table using your TI 83+/84+ graphing calculator.   After the data points are plotted, set Y1 = to the function, and graph.  The function and the scatter plot will overlap as they did at the right. |

What is your function? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| 1. **Exp. Decay** http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/tennispic.gif **Tennis Tournament** | Each year the local country club sponsors a tennis tournament.  Play starts with 128 participants.  During each round, half of the players are eliminated.  How many players remain after 5 rounds? – **Fill in the table below.** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rounds | 1 | 2 | 3 | 4 | 5 |
| Number of  Players left |  |  |  |  |  |

**There are \_\_\_\_\_\_\_\_\_\_ players remaining after 5 rounds.**

**Write the function that models the situation.**

|  |  |
| --- | --- |
| Function: | *a* = the initial amount before the decay begins *r* = decay rate *x* = the number of intervals |
|  | as *x* ranges from 1 to 5 for this problem |

|  |  |
| --- | --- |
| **Decay by half-life:**  http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec1.jpg | The pesticide DDT was widely used in the United States until its ban in 1972.  DDT is toxic to a wide range of animals and aquatic life, and is suspected to cause cancer in humans.  The *half-life* of DDT can be 15 or more years.  ***Half-life* is the amount of time it takes for half of the amount of a substance to decay.**  Scientists and environmentalists worry about such substances because these hazardous materials continue to be dangerous for many years after their disposal.  For this example, we will set the half-life of the pesticide DDT to be 15 years.  **Let's mathematically examine the half-life of 100 grams of DDT.** |
| |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | End of Half life cycle | **1**  15 yrs | **2** 30 yrs | **3** 45 yrs | **4**  60 yrs | **5** 75 yrs | **6**  90 yrs | **7** 105 yrs | **8** 120 yrs | **9** 135 yrs | **10** 150 yrs | | Grams of DDT remaining | 50 | 25 | 12.5 | 6.25 | 3.125 | 1.5625 | .78125 | .390625 | .1953125 | .09765625 | | Pattern: | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec2.gif | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec3.gif | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec4.gif | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec5.gif | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec6.gif | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec7.gif | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec8.gif | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec9.gif | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec10.gif | http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec11.gif | | |
| By looking at the pattern, we see that this decay can be represented as a function:  http://www.regentsprep.org/Regents/math/ALGEBRA/AE7/ExpDec12.gif   |  |  | | --- | --- | | Function: | *a* = the initial amount before the decay begins *r* = decay rate *x* = the number of intervals | |  | as *x* ranges from 1 to 10 for this problem | | |

**Half Life Video Notes (solve using 4-step model)**

**See Plan**

**Do Reflect**