**Is It a Good Deal?**

In a previous activity you saw that the world population vs. year data did **not** fit a linear model. Is there another kind of function that models the kind of growth we saw in the world population vs. year data? Yes! The *exponential* family of functions! To get familiar with this family of functions, let’s explore another situation.

**Situation:** You are offered a job where you will earn $0.02 on the first day of a job and then double your earnings each day.

**Question:** Should you take this job? Is it a good deal? Explain why or why not.

1. The table shows the daily wages for this job for the first nine days. Explain how you know that the data in the table are not linear.

|  |  |
| --- | --- |
| **Day****(*x*)** | **Amount Earned** **(*y*)** |
| 1 | 0.02 |
| 2 | 0.04 |
| 3 | 0.08 |
| 4 | 0.16 |
| 5 | 0.32 |
| 6 | 0.64 |
| 7 | 1.28 |
| 8 | 2.56 |
| 9 | 5.12 |

1. Make a scatter plot of the nine data values from the table by hand or with your calculator. Label and scale the axes.



1. Describe all the patterns you see in the table and in your graph. Do the data look linear? Explain.
2. Do you think this job is a good deal? Explain why or why not.
3. Use the home screen of your graphing calculator to model the pattern and extend the table.



First, clear the home screen.

Next, enter 0.02, your earnings for the first day. Press enter.

Your screen should look like this:

Now, multiply this number by 2 to find the daily wage for the second day.

To do this, press the multiplication key followed by 2. Press enter.

You will see “ANS\*2” to tell you that you have just multiplied the previous answer of .02 by 2. Your screen should now look like this:

To repeat the previous command (multiply the previous answer by 2) just press enter again.

Now you see the daily wage for day 3, which is $0.08.

Your screen should now look like this:

Now you can continue the pattern by pressing enter again and again.

The next time you press enter, you will have the amount you earn on day 4.

Continue to press the enter key and keep track of the function values to fill in the missing values in the table. Begin filling in the amount earned on day 10.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Day****(*x*)** | **Amount Earned (*y*)** | **Day****(*x*)** | **Amount Earned (*y*)** | **Day****(*x*)** | **Amount Earned (*y*)** |
| 1 | 0.02 | 11 |  | 21 |  |
| 2 | 0.04 | 12 |  | 22 |  |
| 3 | 0.08 | 13 |  | 23 |  |
| 4 | 0.16 | 14 |  | 24 |  |
| 5 | 0.32 | 15 |  | 25 |  |
| 6 | 0.64 | 16 |  | 26 |  |
| 7 | 1.28 | 17 |  | 27 |  |
| 8 | 2.56 | 18 |  | 28 |  |
| 9 | 5.12 | 19 |  | 29 |  |
| 10 |  | 20 |  | 30 |  |

1. How much money would your earn on day 30? Is this what you expected?
2. Do you think this job is a good deal? Explain why or why not.
3. Did your opinion of this job change? Explain.
4. Here is another way to represent the amount of money you will earn over time.
5. Enter the function Y1 = 0.01\*2^X in the Y= menu on your calculator.
6. Then go to Table Set up and enter TblStart = 0 and ∆Tbl = 1
7. Press 2nd Table to view the table.

d. How does the table on the calculator compare with the one you made in question 5?