Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

I AM Interested!

Buccaneer Bank offers a mutual fund that you have been investing in since 2000. You initially invested $8000. Below you see the annual balances for the last 13 years.

1. Place your data into your lists: *Year = List 1, and Balance = List 2.*

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Balance | Year | Balance |
| 2000 | 8000 | 2007 | 12020 |
| 2001 | 8540 | 2008 | 12740 |
| 2002 | 8900 | 2009 | 13627 |
| 2003 | 9450 | 2010 | 14255 |
| 2004 | 10100 | 2011 | 15294 |
| 2005 | 10830 | 2012 | 16004 |
| 2006 | 11340 | 2013 | 17068 |

1. Create a Scatterplot of (Year, Balance). *Don’t forget to Zoom 9 to your data*.
	1. Make a precise sketch of what you see. *Provide labels and scales for each axis*.
	2. Explain the patterns you observe on the graph.
2. Use your calculator to find a LINEAR function that best models the growth of the fund.

a. State the equation of your model. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. Define any variables you used in part a.

c. What is the correlation coefficient?

d. Interpret this value (strong or weak, positive or negative) in the context of the problem.

1. Find your Residuals by defining *List 3 = RESID from 2nd STAT #7.*
	1. Make a Residual Plot of (Year = L1, Residuals = L3). *Don’t forget to Zoom 9 to your data*.
	2. Make a quick sketch of what you see.
	3. Interpret your residual plot. What does it tell us about our linear model?
2. Use your calculator to find an EXPONENTIAL function that best models the growth of the fund.

a. State the equation of your model. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. Define any variables you used in part a.

c. What is the correlation coefficient (r)? \_\_\_\_\_\_\_\_\_

d. Which model, linear or exponential, does a better job modeling the growth of the fund?

6. What is the average annual growth rate of this fund according to your model?

7. How long until your money triples? Explain how you arrived at your answer.

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Per:\_\_\_\_\_Date:\_\_\_\_\_\_\_\_\_\_\_\_

1. The table shows the population of two U.S. states (In Thousands). *Source: U.S. Census Bureau.*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1900 | 1910 | 1920 | 1930 | 1940 | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 |
| Arizona | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.7 | 1.3 | 1.8 | 2.7 | 3.7 | 5.1 |

* 1. Create a scatter plot for Arizona on the graph. (5 marks)
	2. Does the data indicate an exponential or linear model? Explain your answer. (5 marks)
	3. Use an appropriate regression a model to determine a model (function) for Arizona’s population vs. years since 1900. Graph your model on the scatter plot. (10 marks)
	4. Define any variables you used in the equation above. (10 marks)
	5. Use your model to determine Arizona’s population in 2010? (5 marks)
	6. At the current rate of growth, when will Arizona’s population reach 8 million people? Explain how you came to your answer. (10 marks)
	7. State the Domain and Range of the function that models the population from 1900 to 2000. (5

marks)

**Lets make an EXPONENTIAL Model** of the data from “The Spread of Disease” activity:

1. Place data into lists. L1 = time , L2 = bacteria
2. View a scatterplot of the data. 2nd , Y= , Zoom 9
3. In Ti-83: STAT 🡪 CALC 🡪 #0 ExpReg (Exponential Regression) . Then your calculator needs to know which is x and which is y. So press L1 , L2  . Then we can store and graph the equation by hitting VARS 🡪 Y-VARS 🡪 FUNCTION 🡪Y1

   

State the equation of your model: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Define any variables you used: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict the number of bacteria after1 day. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ After 2 days. \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Which Scholarship do you choose?**

Coach Auer and Mr. Carter want to give away a scholarship for MBHS students. You may only choose one so read each one carefully.

Scholarship 1: Coach Auer will give you $100 for every *day* of attendance your senior year.

Scholarship 2: Mr. Carter will give you a dime ( $.10) , and increase it by 7.25% for every day of attendance your senior year.

Define your variables

X =

Y =

Make an equation relating money and days

Scholarship 1:

Scholarship 2:

|  |  |  |
| --- | --- | --- |
| Day | Scholarship 1 | Scholarship 2 |
| 0 |  |  |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |
| 9 |  |  |
| 10 |  |  |

1. A typical school year has 180 days. Estimate how many days do you miss each year?
2. Based on your answer for #1, how much money would you earn by choosing scholarship1?
3. Based on your answer for #1, how much money would you earn by choosing scholarship2?
4. Use technology to graph the two equations together. You will definitely have to play with the window. Be sure to scale and label each axis.
5. Based on attendance, when is scholarship 1 the smarter choice? Explain .
6. Based on attendance, when is scholarship 2 the smarter choice? Explain.