

Starbucks Lab: Finding the Exponential Regression of Best Fit

Materials:

Starbucks data Pencil
Calculator Computer

Procedure: **READ THE ENTIRE PROCEDURE BEFORE YOU BEGIN!**

In 1971, Starbucks Coffee opened its first location in Pike Place Market- Seattle's legendary open-air farmer's market. By 1987, the number of Starbucks stores had grown to 17 and by 2005 there were 10,241 locations. The data in the table below (obtained from Starbucks Coffee's Web site, www.starbucks.com) summarize the growth of this company from 1987 through 2005.

Year	Number of Locations
1987	17
1989	55
1991	116
1993	272
1995	676
1997	1412
1999	2498
2001	4709
2003	7225
2005	10,241

- 1) Enter the data in the table into your graphing utility. (Let $t = 0$ represent 1987.)
- 2) Draw a scatterplot for the data.
- 3) Use your calculator to find the Exponential Regression of the data.
- 4) Graph it on your scatterplot.
- 5) Answer the following in complete sentences. **Put these answer on page 3.**
 1. Use the exponential model you just found to predict the total number of Starbucks locations for 2007 and 2008.

2. There were 15,011 Starbucks locations in 2007 and 16,680 locations in 2008. Why is there such a big difference between your predicted values and the actual numbers of Starbucks locations?
3. What real world feature of business growth was not accounted for in the exponential growth model?
4. You need to model the data set with an equation that takes into account the fact that growth of a business eventually levels out or reaches a carrying capacity. Use your graphing utility to find the **logistic regression equation** to model this data set.
5. Use the **logistic model** that you just found to predict the total number of Starbucks locations for 2007 and 2008. How do these predictions compare with the actual number of locations for 2007 and 2008?
6. How many locations do you think there will be in 2020?