Choosing a Model to Represent Data

COLLISIONS AND CASUALTIES 1992-2011				The table on the left shows motor vehicle collision data for the years from 1992 to 2011.				
	COLLISIONS			······································				
VEAD	COLLISIONS			You can ignore the third column of data.				
TEAK	FATAL ¹	PERSONAL INJURY ²		Enter the variables as L1, L2 on your TI-83.				
1992	3,073	169,640		*Remember to start the year at 0!				
1993	3,121	168,106		Analysis (Vearys, Eatal Collisions)				
1994	2,837	164,642		Perform three regression analyses on the data				
1995	2,817	161,950		(linear, quadratic, exponential).				
1996	2,740	153,944		Make sure you create 3 equations (Y1, Y2, Y3)				
1997	2,660	147,549		Be sure to complete Table 1.1 as you go!				
1998	2,583	145,615						
1999	2,632	148,683		*Use your cheat sheet and be sure to add to it if				
2000	2,547	153,300						
2001*	2,413	148,996						
2002	2,583	153,859						
2003	2,487'	150,503r						
2004	2,436	145,161'						
2005	2,550 ^r	145,572'						
2006	2,587'	142,521						
2007	2,462	138,612						
2008	2,192 ^r	127,678'						
2009	2,011'	123,516						
2010	2,026'	123,141						
2011	1,834	121,159						
 "Fatal collisions" include all reported motor vehicle crashes that resulted in at least one death, where death occurred within 30 days of the collision. Personal injury collisions" include all reported motor vehicle crashes which resulted in at least one injury but not death within 30 days of the collision. 								

Table 1.1 - Regression Equations (Year vs. Number of Fatal Collisions)

Туре	Equation	Initial Value	r ² Value	% Confidence
Linear				
Quadratic				
Exponential				

Based on the above table, only, which model is the best fit for the data?

Use your equations to complete the table below.

Table 1.2

Turne	Number of Fatal Collisions in								
туре	1900	1930	1950	1970	2030	2050			
Linear									
Quadratic									
Exponential									

Change the **window** to include x-values from -60 to 60 (Years from 1932 to 2052) and y-values from 0 to 5,000. The three functions will be plotted in the order you created them. Click **graph**.

- a. Describe the behaviour of the linear function over the time period included in the plot.
- b. Describe the behaviour of the quadratic function over the time period included in the plot.
- c. Describe the behaviour of the exponential function over the time period included in the plot.

Based on Table 1.2 and the scatter plots you just looked at on the TI-83,

- a. Which model do you think is best at predicting into the future? Explain.
- b. Which model do you think does the best job at predicting collisions before 1992? Explain.
- c. Based on everything you have done, which model do you think is the most reasonable? Explain.