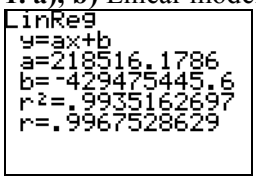
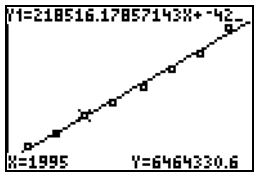
Task
Model Data from Statistics Canada
Sample Solution

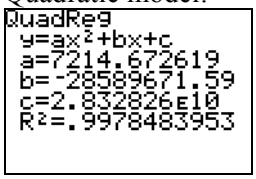
Part A: Model the Energy Use of Canada's Business Sector

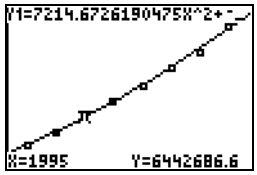
1. a), b) Linear model:



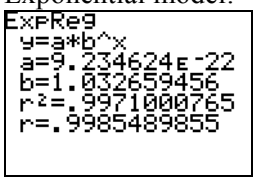


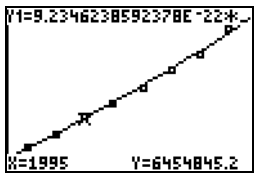
Quadratic model:





Exponential model:



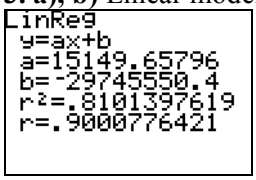


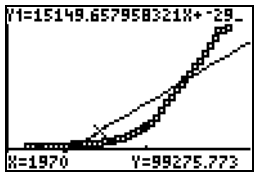
c) Answers may vary. For example: The linear and exponential models have the highest *r*-values. The linear model seems better than the exponential model because the rate of change is approximately constatnt rather than increasing at an increasing rate.

2. a) The graph shows the number of terajoules of energy used by all businesses in Canada from 1993 to 2001. The amount of energy used by businesses in Canada is increasing. The rate of change is approximately constant.
b) No. The increasing trend cannot continue forever. There is a limit to the amount of energy available for consumption. Also, conserving energy and protecting the environment are two issues that are becoming more important to people and businesses.

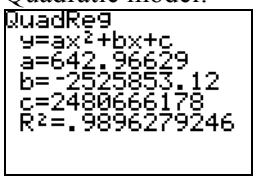
Part B: Model the Amount of Canada's Federal Debt

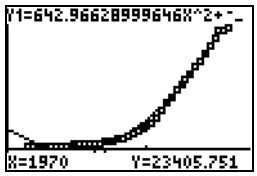
3. a), b) Linear model:



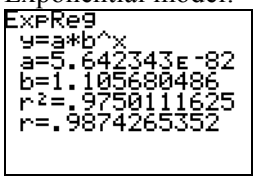


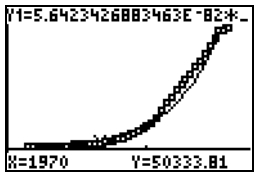
Quadratic model:





Exponential model:

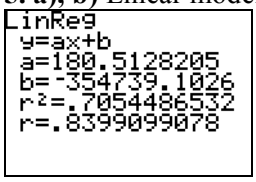


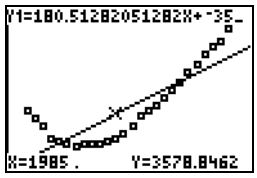


c) Answers may vary. For example: The quadratic and exponential models both seem to fit. The exponential model is best because the rate of change is increasing at an increaing rate.

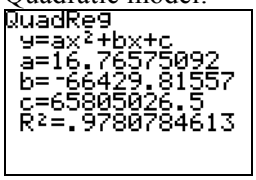
4. a) This graph shows the total amount (in millions of dollars) of the federal debt over a number of years. The amount of the debt is increasing at an increasing rate.
b) No. It is not realistic to think that this trend will continue indefinitely. If the country goes even deeper into debt, then our economy may never recover. Until 2009, the Canadian government has been working hard to keep the budget balanced.

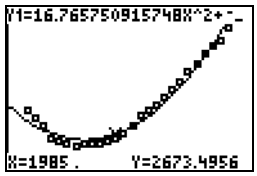
Part C: Model the Birth Rate for Women 40 Years of Age and Over
5. a), b) Linear model:



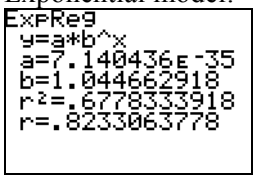


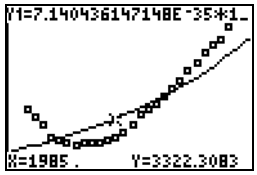
Quadratic model:





Exponential model:





c) The quadratic model is the most appropriate. It has the highest r^2-value and follows the data points very closely.

6. a) This graph shows the total number of live births in Canada of women over 40 over a number of years. Initially, the number of live births decreases, then it increases.
b) No. It is unlikely that this trend will continue. Medical technology has made it possible for older women to deliver healthy babies, but many women over 40 would not choose to have a child.