FOM 12

7.5 – Modelling Data Using Logarithmic Functions
(Logarithmic Regressions)

"Log" Not "Line"

Enter Data: STAT 1: Edit **Then** Create Function: STAT ➡ "CALC" 9: LnReg ENTER ENTER

Example 1: Create a Logarithmic Regression function for the following data.
(Round to the nearest hundredth)

x	100	90.26	73.90	60.51	49.54	40.56
y	0	0.01	0.03	0.05	0.07	0.09

$y = a + b\ln x$ $a = 0.45966$ $b = -0.09984$

$y = 0.46 - 0.10\ln(x)$

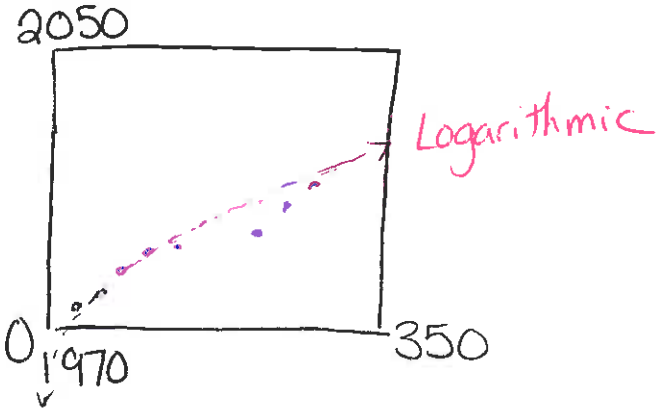
Example 2: (Pg. 488) Lydia is researching the rise in tuition fees for post-secondary education in Alberta for her school website. She found some data that uses the tuition fees in 1992 as the benchmark, assigning them a value of 100%. The tuition fees in all other years are compared with the tuition fees in 1992.

Usually time is independent, but this would create an exponential function.

Tuition Fees as a Percent of Cost in 1992 (%) (x)	Year (y)
37.8	1979
43.8	1982
54.0	1984
58.8	1986
69.4	1989
100.0	1992
222.7	1999
287.1	2004
305.9	2006

Statistics Canada, Table 326-0002—Consumer Price Index (CPI)

a) Create a scatter plot to visualize the type of relationship (regression)



b) Create a regression function for the data using your calculator

$y = a + b\ln x$
$a = 1937.423853$
$b = 11.77807419$

$y = 1937.42 + 11.78\ln(x)$

c) Estimate when the tuition fees will be double what they were in 1992.

Double = 200%
$\therefore x = 200$

$y = 1937.42 + 11.78\ln(200)$
$y = 1999.83$

(around 1999–2000)

Remember, best-fit is an estimate

d) What will the tuition fees be in the year 2010?

$Y_1 = 1937.42 + 11.78\ln(x)$
$Y_2 = 2010$

Find Intersection.

when $y = 2010$, $x = 474.04$

Fees would be about 474% of what they were in 1992

Assignment: Pg. 494 #1 – 3, 5 – 7, 9