

Performing Exponential Regression

Recall: Linear Regression from last unit

Example 1:

- Determine the exponential relation that best fits the data in the following table, where x is the number of years since 1921 and y is the population of British Columbia in millions.
- What do the values of a and b represent in this situation?
- Estimate the population of British Columbia in 2019.

Enter years as

Year	0	10	20	30	40	50	60	70	80
	1921	1931	1941	1951	1961	1971	1981	1991	2001
B.C. Population (millions)	0.52	0.69	0.82	1.17	1.63	2.18	2.82	3.37	4.08

1) Using www.desmos.com

$$y = a \times (b)^x$$

$$y = 0.525233x (1.02718)^x$$

$$y_1 \sim ab^{x_1}$$

Log Mode

STATISTICS
 $r^2 = 0.9923$
 $r = 0.9962$

RESIDUALS
 e_1 plot

PARAMETERS
 $a = 0.525233$

$b = 1.02718$

x_1	y_1
0	0.52
10	0.69
20	0.82
30	1.17
40	1.63
50	2.18
60	2.82
70	3.37
80	4.08

b) $a = 0.525233$

- a represents the initial/starting population of B.C. in 1921.

- b represents the growth factor

$$b = 1.02718 - 1$$

$$= 0.02718$$

$$\doteq 2.7\%$$

(So, on average B.C.'s population has been increasing by 2.7% per year since 1921.)

c) $x = 2019 - 1921$

$$= 98$$

- Sub. $x = 98$ into $y = 0.525233x (1.02718)^x$

$$y = 0.525233x (1.02718)^{98}$$

$$\doteq 7.27$$

So, according to our model, we estimate the B.C.'s population in 2019 would be approximately 7.3 million people.

Entertainment: Pg. 317: #11-13