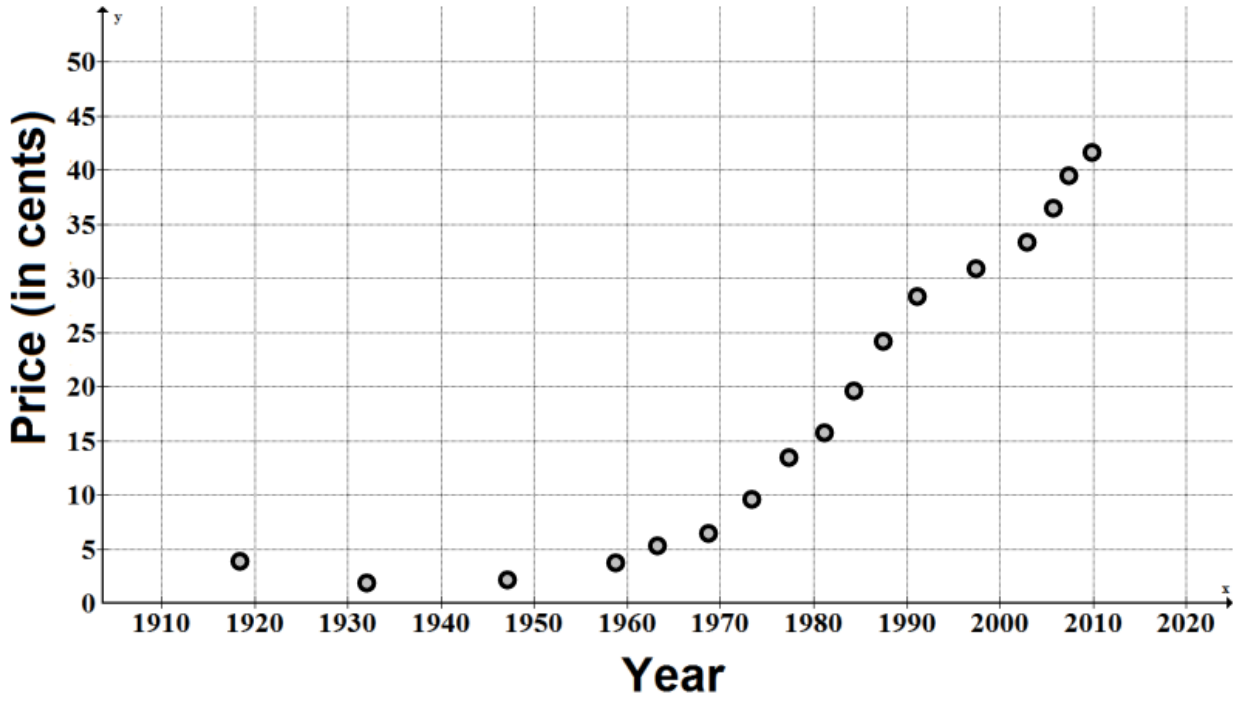
Regression Analyses

Below is a scatter plot of stamp price over time.



1. Based on the scatter plot, alone, do you think this data would be best fit by a linear, quadratic or exponential model? Explain your choice.
2. Use the table of values of the data below to run linear, quadratic and exponential regressions on the data. Complete the table below.

	Year	Price of a Stamp (cents)
0	1918	4
14	1932	2
28	1946	3
40	1958	4
46	1964	5
50	1968	6
56	1974	10
59	1977	13
63	1981	16
66	1984	20
70	1988	24
73	1991	27
80	1998	31
85	2003	33
87	2005	37
88	2006	39
92	2010	42

Regression Model	Equation	Initial Value	r^2	Confidence
Linear	$y = 0.476x + 9.316$	9.316	0.806	80.6%
Quadratic	$y = 0.008x^2 - 0.317x + 4.2$	4.2	0.987	98.7%
Exponential	$y = 1.54 \times 1.04^x$	1.54	0.862	86.2%

3. Which model is the best fit? How do you know?

Quadratic → highest r^2 value / confidence

4. What does each variable (x and y) represent in each model?

x represents years since 1918

y represents stamp price in cents

5. Use the scatter plot on your TI-83 to determine when the price of stamps will reach 70 cents. Explain how you did this.

113 cents

"I changed the window to get a view that would include the curve when y=70 Then I used the cursors (arrows) to find the point on the curve when y=70"

6. Use your equation to estimate the price of stamps in 2030.
Do you think this estimate is accurate? Why or why not?

$y = 0.008x^2 - 0.317x + 4.2$

$y = 0.008(112)^2 - 0.317(112) + 4.2$

$y = 69.05$

$x = 2030 - 1918 = 112$

I think it's accurate. Seems reasonable and fits the graph quite well.

7. Use your equation to estimate the price of stamps in 1800.
Does your answer make sense? Explain why or why not.

$y = 0.008(-118)^2 - 0.317(-118) + 4.2$

$y = 153$ (rounded)

$x = 1800 - 1918 = -118$

nonsensical! Parabola rises into past. Maybe try exponential for this (Joe said so)

8. Was there any part of the analysis that you had trouble with on your TI-83? If so, what?

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