2.5 Notes: Polynomial Models

Rective: Create and use regression models to make predictions.

Modeling means: Creating an equation that fits data. Another name for modeling is regression. Regression analysis helps us predict the unknown using patterns of the known data.

Linear Regression:

$$y = mx + b$$

$$M=1$$

$$b=5$$

$$V=X+5$$

Ex: Find the equation of the line that passes through the points: (-3, 2), (3, 8)

$$M = \frac{\Delta y}{\Delta x}$$
 $M = \frac{8 - 2}{3 - (-3)} = \frac{6}{6} = 1$

1. What kind of regression to choose?

2 points

etc...

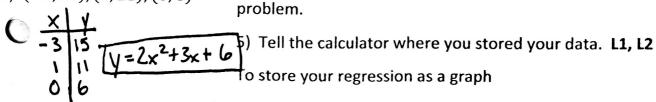
2. Find a polynomial function whose graph passes through each set of points:

a)
$$(4,-1), (-3,13)$$

$$\begin{array}{c|c} X & Y \\ \hline 4 & -1 \\ -3 & 13 \end{array}$$
 $\begin{array}{c|c} Y = -2x + 7 \\ \hline b) & (7, -5), (-1, 3) \end{array}$

Steps to calculating a regression equation on the calculator

- 1) 2nd 0 CATALOG and turn Diagnostic ON
- 1) Press STAT and choose EDIT
- 2) List all of your x values in L1 and all of your y values in
- **L2**. You are making an (x, y) table.
- 3) Press STAT again and use the right arrow to select CALC.
- 4) Choose the type of regression needed to solve the c) (-3, 15), (1, 11), (0, 6)



$$(0,9), (2,21), (-1,0), (3,36)$$

- (2))Press VARS and use the right arrow to select Y-VARS. Choose Function and select Y1. (You will get an arrow if there is already a function stored in Y1.
- 3) You are now ready to graph!

3. Let x = the number of years after 1985

World Gold

Δ.	Year	Production (millions of troy ounces)	
O	1985	49.3	
5	1990	70.2	
10	1995	71.8	
15	2000	82.6	
1			

Sources: The World Almanac and World Gold

a) Find a polynomial function that best models the set of values

4. Let x = the number of years after 1970

Life Expectancy

	Year of Birth	Female (years)
$\mathcal{O}[\![$	1970	74.7
0	1980	77.4
0	1990	78.8
5Q	2000	79.7

Source: U.S. Bureau of the Census

a) Find a polynomial function that best models the set of values

$$y = .038x^3 - .956x^2 + 8.01x + 49.3$$

b) Estimate the life expectancy for women

b) Estimate the world gold production for 2010, 2020, and 2025

$$y = 245.8$$

born in 1960, 1981, and the year you were born.

Example 5. Explain the difference between best fit vs. more likely.