

Finding the Regression Equation

Linear Regression line of best fit for a set of data

Quadratic Regression: parabola of best fit

Correlation Coefficient: how well model fits data
 * r or $r^2 = 1$ or -1

CLEAR MEMORY
 Press: $2^{nd} +, 7, \Delta$

1

TURN ON DIAGNOSTIC

Press 2^{nd} 0

Press x^{-1}

Scroll Down to DiagnosticON

Press Enter, Enter

2

Example #1

Penny works as a waitress at the Cheesecake Factory. Her boyfriend Leonard wanted to know if there were a relationship between the cost of a meal and the tip left, so he recorded the following data.

Meal Cost	\$4.75	\$6.84	\$12.52	\$20.42	\$8.97
Tip	\$0.50	\$0.90	\$1.80	\$2.90	\$1.00

a) Enter the data

3

Press Stat, edit,

Enter x values in L1

Enter y-values in L2.

b) Graph the Data

4

Press 2^{nd} Y=

Enter, Enter

Zoom 9

Does the data appear to be linear or quadratic? linear?

c) Find the correlation coefficient

5

Press Stat, Calc 4 (for linear)

What is the r value? .99456

* $r^2 =$.98915

Press Stat, Calc 5 (for quadratic)

What is the r^2 -value? .98921

Based upon the r-values is the data linear or quadratic? quadratic

d) Write the best model for the data & place it into equation in Y1

6

Press Stat Calc 5, Vars, YVars, Enter, Enter, Enter

What is the Regression Equation?

$$y = -2.696 \times 10^{-4} \cdot x^2 + .161x - .264$$

Predict the tip left if the bill was \$10.50?

_____ $x = 10.50$
\$
\$1.40

Penny wants a \$5 tip. How much should the bill be? $y = 5?$ $x = 34.70$

Example 2:

West Regional Library recorded the number of children in attendance at their noon book reading.

Day	1	2	3	4	5
Attendance	15	24	29	31	30

a) Enter the data

Press Stat, edit,
Enter x values in L1
Enter y-values in L2.

b) Graph the Data

Press 2nd y=
Enter, Enter
Zoom 9
Does the data appear to be linear or quadratic? _____

c) Find the correlation coefficient

Press Stat, Calc 4 (for linear)
What is the r value? _____

Press Stat, Calc 5 (for quadratic)
What is the r²-value? _____

Based upon the r-values is the data linear or quadratic? _____

d) Write the best model for the data & place into Y1

Press Stat Calc 5, Vars, YVars, Enter, Enter

What is the Regression Equation?
 $y = -1.643x^2 + 13.557x + 3.2$

Predict the attendance on day 8?
6.5 → 7 people

On which day will there be approximately 17 people in attendance? Day 7

* Day 7
X Between Day 1 and 2
7.06