Quadratic Regression

The process of finding the equation of the parabola that best fits a set of data

Enter Data	? View Data
Hit STAT, ENTER	 Hit 2nd → y=
Enter x-values in L ₁	Turn Stat Plot ON in
Enter y-values in L2	menu 1
* 1 construction - 1 construction	A Hit ZOOM 9

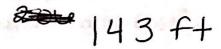
Examples

1. An amusement park ride takes riders to the top of a tower and drops them. The table shows the height, h, of the tower at time t seconds after the drop.

t	0	0.5 1		1.5	2	
h	200	164	120	68	8	

a. Write an equation for the curve of best fit.

b. How many seconds will it take the tower to reach the ground? a fact .75 see



Find Curve

Arrow over to CALC Choose #5-QuadReg Hit ENTER (possibly twice)

Hit STAT

2. Braden jumped off a cliff and into the ocean while vacationing in Hawaii. His height h after time tseconds is given in the table below.

	t	0	1	2	3	4
4	h	480	482	452	390	296

- a. Write an equation for the curve of best fit.
- b. Predict the maximum height of Braden's

$$y = -16x^{2} + 18x + 480$$
 $\frac{-18}{2(-16)} = \frac{9}{10} \rightarrow 1 = 485.00 \text{ ft}$

3. Sarah is standing on a bridge that stands 50 feet above the water. She tosses a coin into the water. The height, h, of the coin at time t seconds is given in the table below.

t	0	0.5	1	1.5	2
h	50	64	70	68	58

- a. Write an equation for the curve of best fit.
- b. What is the height of the coin after 3 seconds?

$$-10(3^2) + 36(3) + 50$$
 $14 ft$

4. The table below shows how wind affects a runner's performance in the 200 meter dash, where s represents the speed of the wind in meters per second and t represents the change in the finishing time. Negative wind speed means the runner is running against the wind while positive wind speed means the runner is running with the wind.

5	-4	-2	0	2	4
t	1.48	0.6	0	-0.5	-1.52

a. Write an equation for the curve of best fit.

y=-0.003x -0.355x+0.038

b. Predict the change in finishing time when the wind is -8 meters per second.

-0.003(-8)2-0.355(-8) +0.038

2.686 seconds

5. A study compared the speed in mile per hour, x, and the average fuel economy in miles per gallon, y, for cars. The results are shown in the table below.

X	20	30	40	50	60	70
y	25.2	28.5	30.1	30.4	27.8	25.0

a. Write an equation for the curve of best fit.

y=-0.008x2+0.752x+13.553

 b. Predict the fuel economy for a car traveling at 35 miles per hour.

-0.008(36) +0.752(35) +13.553

30.072

6. The table below shows the average sale price, p, of a house in Norfolk, Virginia in thousands of dollars during various years, t.

 t
 2005
 2006
 2007
 2008
 2009
 2010

 p
 158
 145
 132
 130
 138
 142

- a. Write an equation for the curve of best fit.
- b. Predict the value of the house in 2020.

y=3.018x2-48.211x+323.857

3.018(20)2-48.211(20)+323.857 \$ 566,837

7. The table below shows the predicted temperatures, y, for different times, x, on a summer day in Denver, CO.

 x
 6 AM
 9 AM
 12 PM
 3 PM
 6 PM
 9 PM

 y
 63
 76
 86
 89
 85
 76

a. Write an equation for the curve of best fit.

y=-0.329x2+9.798x+15.571

b. Predict the high temperature for the day. When does this temperature occur?

 $\frac{-9.798}{2(-0.994)} = 14.89 \rightarrow 2:53$ 88.52°