


# WS - Curve Fitting (Quadratic Functions)

Name \_\_\_\_\_ Date \_\_\_\_\_ Block \_\_\_\_\_

①

**Height of a Ball** A physicist throws a ball at an inclination of  $45^\circ$  to the horizontal. The data below represents the height of the ball  $h$  at the instant it has traveled  $x$  feet horizontally.




Distance, $x$	Height, $h$
20	25
40	40
60	55
80	65
100	71
120	77
140	77
160	75
180	71
200	64

- Using a graphing utility, draw a scatter diagram of the data. ~~Comment on the type of relation that may exist between the two variables.~~
- Find the quadratic function of best fit.
- Using a graphing utility, draw the quadratic function of best fit on your scatter diagram.
- Using the function found in (b), how far will the ball travel before it reaches its maximum height?
- Using the function found in (b), determine the maximum height of the ball.
- Compare your result in (d) and (e) to the data.
- Determine the horizontal distance the ball will travel based on the function found in (b).

②

**Enrollment in Public Schools** The data below represents the enrollment  $E$  in all public schools (both elementary and high school) for the academic years 1980–1981 to 1988–1989. Let 1 represent the academic year 1980–1981, 2 the academic year 1981–1982, and so on.




Year, $t$	Enrollment, $E$
1	41.5
2	40.8
3	40.1
4	39.6
5	39.1
6	39.1
7	39.6
8	39.8
9	40.1

- Using a graphing utility, draw a scatter diagram of the data. ~~Comment on the type of relation that may exist between the two variables.~~
- Find the quadratic function of best fit.
- Using a graphing utility, draw the quadratic function of best fit on your scatter diagram.
- Using the function found in (b), determine when enrollment was lowest.
- Compare your result in (d) to the data.
- Using the function found in (b), predict the enrollment for 1991–1992.

③

**Miles Per Gallon** An engineer collects data showing the speed  $s$  of a Ford Taurus and its average miles per gallon,  $M$ . See the table.



Speed, $s$	Miles per Gallon, $M$
30	18
35	20
40	23
40	25
45	25
50	28
55	30
60	29
65	26
65	25
70	25

- Using a graphing utility, draw a scatter diagram of the data. ~~Comment on the type of relation that may exist between the two variables.~~
- Find the quadratic function of best fit.
- Using a graphing utility, draw the quadratic function of best fit on your scatter diagram.
- Using the function found in (b), determine the speed that maximizes miles per gallon.
- Compare your result in (d) to the data.
- Using the function found in (b), predict the miles per gallon of the car if you travel an average of 63 miles per hour.