Lesson Notes 6-5 Modeling Data With a Curve of Best Fit

If a scatter plot seems to follow a curved trend, then there may be a quadratic or cubic relationship between the data instead of a linear relationship. To determine the curve of best fit the same procedures are used as in last lesson.

Example 1: A pebble falls from a Cliffside into the river 30 m below. This table gives the height of the pebble as it falls.

Time (s)	0	0.5	1	1.2	1.5	2.0
Height (m)	30.00	28.77	25.11	22.97	18.98	10.42

x
y

a) Use quadratic regression to determine the equation of the curve of best fit.

$y = ax^2 + bx + c$

$y = -4.9x^2 + 0.015x + 30$

b) Use your equation to determine the height of the pebble after 1.25 s.

$y = -4.9(1.25^2) + 0.015(1.25) + 30$

$= 22.36$

c) When does the pebble hit the river, to the nearest hundredth of a second?

$0 = -4.9x^2 + 0.015x + 30$

$x = 2.5$

Example 2: A biochemist is studying the growth of recently discovered bacteria. She collects the data shown.

Day	1	2	3	4	5	6	7	8
Mass (g)	3.2	4.6	5.4	4.2	5.5	7.1	8	9.2

a) Use cubic regression to determine the equation of the curve of best fit for the data.

$y = 0.023x^3 - 0.23x^2 + 1.26x + 2.44$

b) Estimate the mass of the bacteria on Day 11.

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