

- 1. Least Squares Tutorial** The following mock problem uses the least squares approach to solve a simple problem that has more equations than unknowns.

Some Berkeley students want to model the shape of the cables on the Golden Gate Bridge with an equation for a parabola:

$$ax^2 + bx + c = y$$

To do this, they take measurements of the distance from the midpoint of the parabola and the height of the cable at different points.

d (ft)	y(ft)
16.25	889.90
15.19	790.43
⋮	⋮

The first step is to model this as a least squares problem to fit the points to a parabola of the form

$$ax^2 + bx + c = y$$

- (a) Model this problem in the form $Ax = b$. That is, find what A, b , and x should be in this scenario.

- (b) Write the matrix multiplications required to solve for the appropriate coefficients.

- (c) How do you think the fit would be affected if more equations were added?