# Section 2.6. Mathematical Models: Building Functions

Note. In this section we build math models (functions) based on real-world information given in a descriptive way. The vintage terminology that the text book avoids is "word problems." Some of the problems seen here will be seen again in Calculus 1 (see, for example, my online Calculus 1 notes on 4.6. Applied Optimization Problems).

Example. Page 106 Example 2.6.1. Let $P = (x, y)$ be a point on the graph of $y = x^2 - 1$. **(a)** Express the distance d from P to the origin O as a function of x. **(b)** What is d if $x = 0$? **(c)** What is d if $x = 1$. **(d)** What is d if $x = \sqrt{2}/2$?
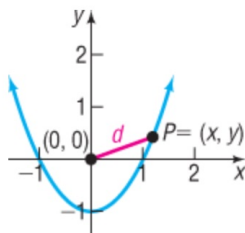
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Note. Here is a graph of d (generated in Wolfram Alpha):
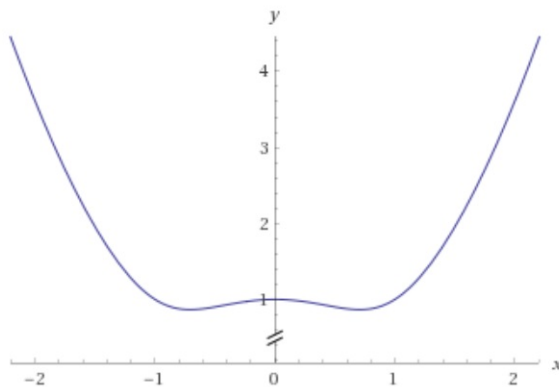
In Calculus 1, you will have a rigorous technique to find where the minimum of the graph occurs. It appears from the graph that there is a minimum around $x = 3/4$. In fact, the minimum occurs at $\sqrt{2}/2 \approx 0.707$.

Examples. Page 109 numbers 6, 10, Page 110 numbers 16, 20, Page 111 number 22.

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