

- 1 The cost (in dollars) of renting a moving truck for a day is given as a function of the distance driven (in miles) by

$$C(x) = 0.25x + 35.$$

- a Suppose that you want the cost to be no more than \$100. What is the maximum distance that you can drive?

The cost must be less than or equal to \$100; that is, $C(x) \leq 100$:

$$0.25x + 35 \leq 100;$$

$$0.25x \leq 65;$$

$$x \leq 260.$$

Therefore, the maximum distance that I can drive is 260 **miles**.

- b **Extra credit:** How might one describe (in ordinary English) the cost of renting the truck for the day?

It costs \$35 plus 25¢ per mile.

- 2 Consider the graph of the quadratic function $f(x) = x^2 + 2x$.

I have $a = 1$, $b = 2$, and $c = 0$.

- a Find the vertex of this graph. (Show what numerical calculations you make or what equations you solve.)

First,

$$h = -\frac{b}{2a} = -\frac{2}{2(1)} = -1.$$

Next,

$$k = f(h) = f(-1) = (-1)^2 + 2(-1) = -1.$$

Therefore, the vertex is

$$(-1, -1).$$

- b Find the intercepts of this graph. (Show what numerical calculations you make or what equations you solve.)

Since $c = 0$, the vertical intercept is

$$(0, c) = (0, 0),$$

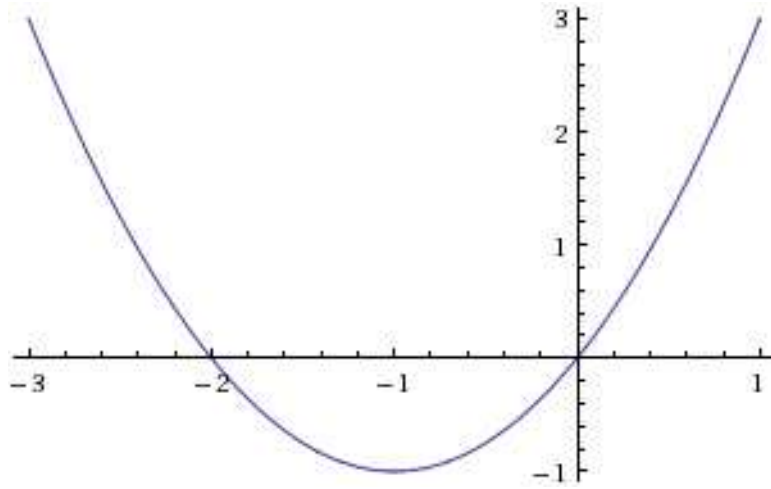
which is also a horizontal intercept. The other horizontal intercept is then

$$(2h, c) = (-2, 0).$$

(You can also find the horizontal intercepts by solving the equation $f(x) = 0$.)

c Graph this function; mark and label at least three points on the graph.

The intercepts and the vertex comprise my three points. Here is the graph:



(This graph was produced using Wolfram Alpha.)