Consider the graph of the quadratic function $f(x) = -2x^2 + 2x - 3$.

Note: I have $a = -2$, $b = 2$, and $c = -3$.

1 *Find the vertex of this graph. (Show what numerical calculations you make or what equation you solve.)*

First,

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

Next,

$$k = f(h) = f\left(\frac{1}{2}\right) = -2\left(\frac{1}{2}\right)^2 + 2\left(\frac{1}{2}\right) - 3 = -\frac{5}{2}.$$

Therefore, the vertex is

$$\left(\frac{1}{2}, -\frac{5}{2}\right).$$

2 *Find the intercepts of this graph. (Show what numerical calculations you make or what equation you solve.)*
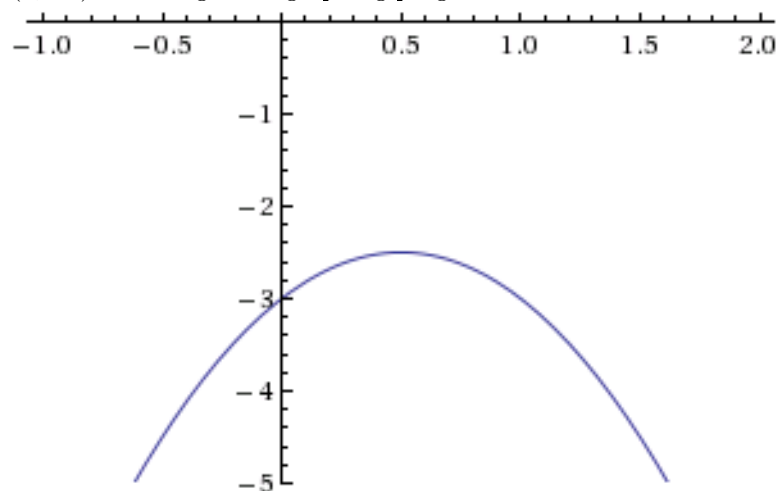
Since $c = -3$, the vertical intercept is

$$(0, -3).$$

Since a and k have the same sign (both negative), there are no horizontal intercepts.

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

The obvious points to mark are $(h, k) = (1/2, -5/2)$, $(0, c) = (0, -3)$ (the vertical intercept), and $(2h, c) = (1, -3)$. I can't get the graphing program that I use to mark these, however.

(This graph was produced by Wolfram Alpha. There should also be arrows at the ends of the graph.)