Exercise 1 *Quadratic Equations*

(a) Create a file `quadratic.hs` containing a Haskell function `square x` which takes an argument x and returns x^2.

(b) Load your file in `ghci` with the command `ghci quadratic.hs`. Run the following commands:

```
square 2
square (-2)
square -2
```

What do you observe?

(c) Write a function `discr a b c` which takes numerical arguments a, b, and c and returns $\sqrt{b^2 - 4ac}$. You may assume that $b^2 - 4ac$ is non-negative.

Hint: The Prelude contains a built-in function `sqrt` to calculate the square root of a number.

Example: `discr 2 17 8 = 15.0`

(d) The quadratic equation $ax^2 + bx + c = 0$ where a, b, c are numbers has exactly two distinct real solutions for x if $b^2 - 4ac > 0$. The two solutions are given by the quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Write a function `quadratic a b c` which returns the two solution values for x. You may assume that $b^2 - 4ac > 0$.

Hint 1: You should call your function `discr` in the definition of `quadratic` rather than copying the code.

Hint 2: You can return two values from a function by returning a tuple `quadratic a b c = (0, 0)` and replacing the value "0" with the values you wish to return.

Example: `quadratic 2 17 8 = (-0.5, -8.0)`