

# Quadratic Function

Humphrey

2022-05-31

A quadratic equation is an equation of the form  $ax^2 + bx + c = 0$ , where **a**, **b**, and **c** are constants. One can solve the value of **x** given the values of **a**, **b** and **c** using the quadratic formula below:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}, \quad \text{where } a \neq 0$$

The roots are real and distinct when the discriminant  $b^2 - 4ac$  is equal to zero, real and equal when the discriminant is equal to 0 and complex if the discriminant is less than zero. The function is:

```
quadratic= function(a,b,c){  
  x=(-b+c*(-1,1)*(sqrt(b^2-(4*a*c))))/(2*a)  
  x  
}
```

Lets take for example the equation  $x^2 - 45x + 324$ . The roots are real and distinct. In this case, **a=1**, **b=-45** and **c=324**. We pass a,b and c as the arguments of the function and the pair of roots is generated.

```
quadratic(a=1,b=-45,c=324)
```

```
## [1] 9 36
```

However, this will not work in the case of complex roots. The below function will tell you if the roots are complex.

```
quadratic2 = function(a, b, c){  
  discriminant = b^2 - 4*a*c  
  x1 = (-b - sqrt(discriminant))/(2*a)  
  x2 = (-b + sqrt(discriminant))/(2*a)  
  if (discriminant < 0){  
    cat("The roots are complex");  
  }  
  else  
    cat("The two roots are", x1, "and", x2, "\n");  
}
```

[Click here to Follow me on Github](#)