QUADRATIC EQUATIONS I

1. Small vocabulary

Derive – odvodit

Discriminant - diskriminant

Equation – rovnice

Polynom – mnohočlen

Root – kořen

Variable – proměnná

2. What is a quadratic equation?

It is the second-order polynomial equation with a single variable x.

$$\boldsymbol{ax^2 + bx + c = 0}$$

Numbers a, b and c are the coefficients of quadratic equation and the coefficient a must be different from 0. If the coefficient a is 0, it will be a linear equation.

3. How to solve a quadratic equation?

We can solve a quadratic equation by a quadratic formula:

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

$\boldsymbol{D = b^2 - 4ac}$ is called a discriminant. If it has a positive value, the equation has 2 roots. If it is 0, the equation has only 1 root and if it has a negative value, the equation does not have a solution.

4. Example

$$x^2 + 5x + 4 = 0$$

Coefficients: $a = 1, b = 5, c = 4$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-5 \pm \sqrt{5^2 - 4 \cdot 1 \cdot 4}}{2 \cdot 1} = \frac{-5 \pm \sqrt{25 - 16}}{2} = \frac{-5 \pm \sqrt{9}}{2} = \frac{-5 \pm 3}{2} = \begin{matrix} \therefore \\ \ddots \end{matrix} \begin{matrix} = \frac{-8}{2} = -4 \\ = \frac{-2}{2} = -1 \end{matrix}$$

5. Exercises

a) $3x^2 + 5x - 2 = 0$

b) $5x^2 + 2x + 2 = 0$

c) $x^2 + 7x - 8 = 0$

d) $x^2 + 4x + 4 = 0$

e) $15x^2 + 8x - 1 = 0$

f) $-3x^2 + 2x - 1 = 0$