

# QUADRATIC EQUATIONS III

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## 1. Small vocabulary

Equation – rovnice

Quadratic equation – kvadratická rovnice

Factorization – rozklad na součin

Root – kořen

Linear – lineární

Term – člen

Polynom – mnohočlen

Variable – proměnná

## 2. Quadratic equation without an absolute term

A quadratic equation is the second-order polynomial equation with in a single variable  $x$ .

$$ax^2 + bx + c = 0$$

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

If the coefficient  $b$  is 0, we will have a quadratic equation without a linear term.

$$ax^2 + c = 0$$

## 3. How to solve a quadratic equation without a linear term?

We can solve this type of equation by the factorization. We can use the formula  $a^2 + b^2 = (a + b) \cdot (a - b)$  and we will obtain the product of two linear polynoms on the left and zero on the right side. We will solve these two linear equations.

## 4. Example

$$x^2 - 9 = 0$$

$$(x + 3) \cdot (x - 3) = 0$$

$$x + 3 = 0 \quad \text{or} \quad x - 3 = 0$$

$$x_1 = -3 \quad x_2 = +3$$

$$x^2 + 9 = 0$$

$$x \in \emptyset$$

Because  $x^2 \neq -9$  for any real number.

## 5. Exercises

a)  $x^2 - 81 = 0$

c)  $x^2 - 4 = 0$

e)  $x^2 + 8 = 0$

b)  $5x^2 + 125 = 0$

d)  $x^2 - \frac{1}{4} = 0$

f)  $x^2 - 3 = 0$

