

## 2.6 Equations

Real numbers:  $a, b, c, p, q, u, v$

Solutions:  $x_1, x_2, y_1, y_2, y_3$

### 119. Linear Equation in One Variable

$$ax + b = 0, \quad x = -\frac{b}{a}.$$

### 120. Quadratic Equation

$$ax^2 + bx + c = 0, \quad x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

### 121. Discriminant

$$D = b^2 - 4ac$$

### 122. Viète's Formulas

If  $x^2 + px + q = 0$ , then

$$\begin{cases} x_1 + x_2 = -p \\ x_1 x_2 = q \end{cases}.$$

### 123.

$$ax^2 + bx = 0, \quad x_1 = 0, \quad x_2 = -\frac{b}{a}.$$

### 124.

$$ax^2 + c = 0, \quad x_{1,2} = \pm \sqrt{-\frac{c}{a}}.$$

### 125. Cubic Equation. Cardano's Formula.

$$y^3 + py + q = 0,$$

$$y_1 = u + v, \quad y_{2,3} = -\frac{1}{2}(u + v) \pm \frac{\sqrt{3}}{2}(u + v)i,$$

where

$$u = \sqrt[3]{-\frac{q}{2} + \sqrt{\left(\frac{q}{2}\right)^2 + \left(\frac{p}{3}\right)^2}}, \quad v = \sqrt[3]{-\frac{q}{2} - \sqrt{\left(\frac{q}{2}\right)^2 + \left(\frac{p}{3}\right)^2}}.$$