

Today's Date: 1/8/18

4.5 Solving Polynomial Equations

*Note: The degree of the polynomial indicates the number of solutions (a.k.a roots or zeroes) that the polynomial equation can have.
 → highest exponent

To solve a polynomial equation by factoring:

1. Set the equation equal to zero.
2. Factor the polynomial.
3. Set each factor equal to zero.
4. Solve each bitty equation.
5. Write your solutions as a solution set. Solutions should be given as fractions in simplest form. *No decimals!*

Examples

Solve each equation by factoring.

$$x = \{0, 3\}$$

1. $2x^3 - 12x^2 + 18x = 0$

$$2x(x^2 - 6x + 9) = 0$$

$$2x(x-3)(x-3) = 0$$

$$2x(x-3)^2 = 0$$

$$2x = 0 \quad x - 3 = 0 \quad x - 3 = 0$$

$$x = 0$$

$$x = 3$$

$$x = 3$$

$$2. \quad 9m^5 = 27m^3$$

$$9m^5 - 27m^3 = 0$$

$$m = \{-\sqrt{3}, 0, \sqrt{3}\}$$

$$9m^3(m^2 - 3) = 0$$

$$m = 0, \pm\sqrt{3}$$

$$\frac{9m^3}{9} = \frac{0}{9}$$

$$\frac{m^2 - 3}{m^2} = \frac{0}{m^2}$$

$$m^3 = 0$$

$$m \cdot m \cdot m = 0$$

$$m = 0$$

$$m = \pm\sqrt{3}$$

Find the zeros of the function.

$$3. \quad f(x) = x^3 - 4x^2 + 4x$$

$$x = 0, 2$$

$$x^3 - 4x^2 + 4x = 0$$

$$x(x^2 - 4x + 4) = 0$$

$$x(x - 2)^2 = 0$$