

In the first semester, you used several methods for factoring polynomials. As with some quadratic equations, factoring a polynomial equation is one way to find its REAL roots.

Recall the Zero Product Property. You can find the roots, or **ZEROS**, of the polynomial equation $P(x) = 0$ by setting each **FACTOR** equal to **ZERO** and solving for x .

What are the Steps to Solving Polynomial Equations ?

1. set equal to 0
2. FACTOR
3. Set each factor = 0 and solve

Real Roots of Polynomial Functions FACTORING!

GLUE HERE

a. $x^2 - 9 = 0$

$$(x-3)(x+3)$$

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

$$x=3 \quad x=-3$$

$$x = 3, -3$$

b. $x^2 + 3x = 10$

$$x^2 + 3x - 10 = 0$$

$$(x+5)(x-2) = 0$$

$$x+5=0 \quad x-2=0$$

$$x=-5 \quad x=2$$

$$x = -5, 2$$

c. $x^4 - 13x^2 = -36$

$$x^4 - 13x^2 + 36 = 0$$

$$(x^4 - 9x^2)(-4x^2 + 36) = 0$$

$$x^2(x^2-9) - 4(x^2-9)$$

$$(x^2-9)(x^2-4)$$

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

$$\begin{array}{llll} x-3=0 & & x-2=0 & \\ x=3 & x+3=0 & x=2 & x+2=0 \\ & x=-3 & & x=-2 \end{array}$$

$$x = \pm 3, \pm 2$$

d. $x^3 - 2x^2 - 25x = -50$

$$(x^3 - 2x^2)(-25x + 50) = 0$$

$$x^2(x-2) - 25(x-2)$$

$$(x^2 - 25)(x-2)$$

$$(x-5)(x+5)(x-2) = 0$$

$$x-5=0 \quad x+5=0 \quad x-2=0$$

$$x=5 \quad x=-5 \quad x=2$$

$$x = \pm 5, 2$$

D. $3x^5 + 18x^4 + 27x^3 = 0$

$$3x^3(x^2 + 6x + 9) = 0$$

$$3x^3(x+3)(x+3) = 0$$

$$\begin{array}{lll} 3x^3=0 & x+3=0 & x+3=0 \\ x=0 & x=-3 & x=-3 \end{array}$$

$$x = 0, -3$$

E. $2x^6 - 10x^5 = 12x^4$

$$2x^6 - 10x^5 - 12x^4 = 0$$

$$2x^4(x^2 - 5x - 6)$$

$$2x^4(x-6)(x+1) = 0$$

$$x=0 \quad x=6 \quad x=-1$$

$$x = -1, 0, 6$$