

Name: _____ Hour: _____ Date: _____

HONORS - Solving Higher Degree Polynomials Notes

Yesterday we factored higher degree polynomials using the quadratic pattern... Today we'll solve them.

Things to remember:

- the polynomial must equal 0
- factor completely
- set each factor equal to 0
- $i = \sqrt{-1}$

Examples: Factor each polynomial. Then find the roots of each polynomial.

1) $x^4 + 11x^2 + 18 = 0$

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

$$x^2 + 9 = 0$$
$$\sqrt{x^2} = \sqrt{-9}$$

$$x = \pm 3i$$

$$x^2 + 2 = 0$$
$$\sqrt{x^2} = \sqrt{-2}$$

$$x = \pm i\sqrt{2}$$

2) $x^4 - x^2 = 12$

$$x^4 - x^2 - 12 = 0$$

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

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

$$x + 2 = 0$$
$$x = -2$$

$$x - 2 = 0$$
$$x = 2$$

$$x^2 + 3 = 0$$
$$x^2 = -3$$
$$x = \pm i\sqrt{3}$$

3) $2x^7 + 10x^4 + 8x = 0$

$$2x(x^6 + 5x^3 + 4) = 0$$

$$2x(x^3 + 4)(x^3 + 1) = 0$$

$$2x(x^3 + 4)(x + 1)(x^2 - x + 1) = 0$$