

Notes: Solve by Factoring

1. $3x^4 - 3x^2 = 0$

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

$$3x^2 = 0 \quad x^2 - 1 = 0$$

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

2. $2x^5 + 24x = 14x^3$

$$2x^5 - 14x^3 + 24x = 0$$

$$2x(x^4 - 7x^2 + 12) = 0$$

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

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

$$x = 0, -2, 2, \pm\sqrt{3}$$

3. $x^4 - 1 = 0$

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

$$(x+1)(x-1)(x+i)(x-i) = 0$$

$$x = \pm 1, \pm i$$

4. $5x^3 = 320$

$$5x^3 - 320 = 0$$

$$5(x^3 - 64) = 0$$

$$5(x-4)(x^2+4x+16) = 0 \quad \text{CFS}$$

$$5=0 \quad x-4=0 \quad \text{or} \quad x^2+4x+4 = -16+4$$

$$x = 4$$
$$x = -2 \pm 2i\sqrt{3}$$

$$(x+2)^2 = -12$$

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

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

5. $x^3 - 4x^2 + 4x - 16 = 0$

$$(x^3 - 4x^2) + (4x - 16) = 0$$

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

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

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

$$x = \pm 2i, 4$$

$$6. \quad x^3 + 5x^2 = x$$

$$x^3 + 5x^2 - x = 0$$

$$x(x^2 + 5x - 1) = 0$$

Quad.
Form.

$$x = 0$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(1)(-1)}}{2(1)}$$

$$x = \frac{-5 \pm \sqrt{29}}{2} = \boxed{\frac{-5 \pm \sqrt{29}}{2}}$$