

Lesson 1-4 PART 2

Example 1) $x^4 - 41x^2 + 400 = 0$

$$(x^2 - 25)(x^2 - 16) = 0$$

$$(x+5)(x-5)(x+4)(x-4) = 0$$

$x = -5, -4, 4, 5$
order from least to greatest

Example 3) $x^2 + 24x + \sqrt{x^2 + 24x} = 30$

$u = \sqrt{x^2 + 24x}$

$$u^2 + u - 30 = 0$$

$$(u+6)(u-5) = 0$$

$u = -6, 5$

$-6 = \sqrt{x^2 + 24x}$ (crossed out)

$5 = \sqrt{x^2 + 24x}$

$$25 = x^2 + 24x$$

$$0 = x^2 + 24x - 25$$

$$(x+25)(x-1) = 0$$

$x = -25, 1$

Example 2) $42x^4 - x^2 - 1 = 0$

$$x^4 - x^2 - 42 = 0$$

$$(x^2 - 7)(x^2 + 6) = 0$$

divide

$x^2 = \frac{1}{6}$ $x^2 = -\frac{1}{7}$ (crossed out)

$x = \pm \sqrt{\frac{1}{6} \cdot \frac{16}{16}} = -\frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}$

Example 4) $2x^{1/2} - 9x^{1/4} + 5 = 0$

$u = x^{1/4}$

$$2u^2 - 9u + 5 = 0$$

$$\frac{9 \pm \sqrt{81 - 4(2)(5)}}{4}$$

$x^{1/4} = \frac{9 \pm \sqrt{41}}{4}$

$x = \left(\frac{9 \pm \sqrt{41}}{4} \right)^4$

Example 5) $x + \sqrt{x} = 20$

$u = \sqrt{x}$

$$u^2 + u - 20 = 0$$

$$(u+5)(u-4) = 0$$

$u = -5, 4$

$-5 = \sqrt{x}$ (crossed out)

$4 = \sqrt{x}$

$x = 16$

Example 6) $x^{-2} - 9x^{-1} + 18 = 0$

$u = x^{-1}$

* Change answers to fractions

$$x^2 - 9x + 18 = 0$$

$$(x-6)(x-3) = 0$$

$x = 6, 3$

$x = \frac{1}{6}, \frac{1}{3}$

Example 7) $x - 5x\sqrt{x} = 0$

$$x^2 = (5x\sqrt{x})^2$$

$$x^2 = 25x^2 \cdot x$$

$$x^2 = 25x^3$$

$$0 = 25x^3 - x^2$$

$$x^2(25x - 1)$$

$$x = 0 \quad 25x - 1 = 0$$

$$25x = 1$$

$$x = 0, \frac{1}{25}$$

Example 8) $\frac{1}{(x+4)^2} = \frac{1}{x+4} + 56$

$$u = \frac{1}{x+4}$$

$$u^2 - u - 56 = 0$$

$$(u - 8)(u + 7) = 0$$

$$u = 8, -7$$

$$\frac{8}{1} = \frac{1}{x+4}$$

$$8x + 32 = 1$$

$$8x = -31$$

$$x = -\frac{31}{8}$$

$$-\frac{7}{1} = \frac{1}{x+4}$$

$$-7x - 28 = 1$$

$$-7x = 29$$

$$x = -\frac{29}{7}$$