

College Algebra - Lecture 06

ch. 1.4

3/20/23

Solve Radical Equations:

(ex) $\sqrt{x-1} = x-7$

$$(\sqrt{x-1})^2 = (x-7)^2$$

$$x-1 = x^2 - 14x + 49$$

$$x^2 - 15x + 50 = 0$$

$$(x-10)(x-5) = 0$$

$$x-10=0; x-5=0$$

$$x=10; x=5 \quad \{10, 5\}$$

(ex) $\sqrt{2x+3} = \sqrt{x+2} + 2$

$$(\sqrt{2x+3})^2 = (\sqrt{x+2} + 2)^2$$

$$2x+3 = (\sqrt{x+2})^2 + 4\sqrt{x+2} + 4$$

$$2x+3 = x+2 + 4\sqrt{x+2} + 4$$

$$2x+3 = x+6 + 4\sqrt{x+2}$$

$$x-3 = 4\sqrt{x+2}$$

$$(x-3)^2 = (4\sqrt{x+2})^2$$

$$x^2 - 6x + 9 = 16x + 32$$

$$x^2 - 22x - 23 = 0$$

$$(x-23)(x+1) = 0$$

$$x-23=0; x+1=0$$

$$x=23; x=-1$$

$$\{23, -1\}$$

Solve Equations in Quadratic Form:

(ex) $(x+2)^2 + 11(x+2) - 12 = 0$

$$\text{let } u = x+2$$

$$u^2 = (x+2)^2$$

$$\hookrightarrow u^2 + 11u - 12 = 0$$

$$(u+12)(u-1) = 0$$

$$u=12; u=1$$

$$u = x+2$$

$$\hookrightarrow x+2 = -12 \text{ or } x+2 = 1$$

$$x = -14$$

$$x = -1$$

(ex) $x + 2\sqrt{x} - 3 = 0$

$$\text{let } u = \sqrt{x} \quad \hookrightarrow u^2 + 2u - 3 = 0$$

$$u^2 = x \quad \hookrightarrow (u+3)(u-1) = 0$$

$$u = -3, 1$$

$$u = \sqrt{x}; \sqrt{x} = -3; \sqrt{x} = 1$$

$$x = 9; x = 1$$

Solve Equations By factoring

(ex) $x^4 = 4x^2$

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

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

$$x^2 = 0; x^2 - 4 = 0 \quad \{-2, 0, 2\}$$

$$x = 0; x^2 = 4$$

$$x = 2, -2$$