

## Section 2.5 – Final Exam Prep

Answer the following three questions, show as many steps as you need to, write clearly and neatly.

1. Solve the Radical Equation, state the Domain Restrictions and Check for Extraneous Solutions

$$2\sqrt{x-1} = x \quad x \geq 1$$

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

$$4(x-1) = x^2$$

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

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

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

$$2\sqrt{2-1} = 2$$

$$2\sqrt{1} = 2$$

$$2 = 2 \quad \checkmark$$

$$\boxed{x=2}$$

2. Solve the Radical Equation, state the Domain Restrictions and Check for Extraneous Solutions

$$\sqrt{3x+10} + 5 = 2x \quad 3x+10 \geq 0$$

$$\sqrt{3x+10} = 2x-5$$

$$3x+10 = 4x^2 - 20x + 25$$

$$0 = 4x^2 - 23x + 15 \quad \begin{matrix} 60 \\ 20 \ 3 \end{matrix}$$

$$0 = 4x^2 - 20x - 3x + 15$$

$$0 = 4x(x-5) - 3(x-5)$$

$$0 = (4x-3)(x-5)$$

$$\cancel{x = \frac{3}{4}} \quad x = 5$$

$$3x \geq -10$$

$$x \geq \frac{-10}{3}$$

$$\sqrt{3\left(\frac{3}{4}\right) + 10} + 5 = 2\left(\frac{3}{4}\right)$$

$$\sqrt{\frac{9}{4} + \frac{40}{4}} + 5 = \frac{3}{2}$$

$$\sqrt{\frac{49}{4}} + 5 = \frac{3}{2}$$

$$\frac{7}{2} + 5 = \frac{3}{2}$$

$$\frac{17}{2} = \frac{3}{2} \quad \times$$

$$\sqrt{3(5) + 10} + 5 = 2(5)$$

$$\sqrt{15 + 10} + 5 = 10$$

$$\sqrt{25} = 5$$

$$5 = 5 \quad \checkmark$$

$$\boxed{x=5}$$

3. Solve the Radical Equation, state the Domain Restrictions and Check for Extraneous Solutions

$$\sqrt{1-x} + \sqrt{x+9} = 4$$

$$1-x \geq 0 \quad \begin{cases} x+9 \geq 0 \\ x \geq -9 \end{cases}$$

$$x \leq 1$$

$$-9 \leq x \leq 1$$

$$\sqrt{x+9} = (4 - \sqrt{1-x})^2$$

$$x+9 = 16 - 8\sqrt{1-x} + 1-x$$

$$x+9 = 17 - 8\sqrt{1-x} - x$$

$$(2x-8)^2 = (-8\sqrt{1-x})^2$$

$$4x^2 - 32x + 64 = 64(1-x)$$

$$4x^2 - 32x + 64 = 64 - 64x$$

$$4x^2 + 32x = 0$$

$$4x(x+8) = 0$$

$$x=0 \text{ or } x=-8$$

$$\sqrt{1-0} + \sqrt{0+9} = 4$$

$$\sqrt{1} + \sqrt{9} = 4$$

$$1+3 = 4$$

$$4 = 4 \quad \checkmark$$

$$x=0$$

$$\sqrt{1-(-8)} + \sqrt{-8+9} = 4$$

$$\sqrt{9} + \sqrt{1} = 4$$

$$3+1 = 4$$

$$4 = 4 \quad \checkmark$$

$$x=-8$$