NAME:_____

U4:L3 Radical Equations

Read pages 294- 300 of your textbook to fill in the following notes, or use notes online at www.burnspvw.weebly.com

When solving a radical equation, remember to...

- Identify any RESTRICTIONS on the variable.
- Identify whether any ROOTS are EXTRANEOUS by determining whether the values satisfy the ORIGINAL EQUATION.

Solving with One Radical Term

What are the restrictions on x in $5 + \sqrt{2x-1} = 12$ if the radical is a **real** number?

$2x - 1 \geq 0$

$2x \geq 1$

$x \geq 1/2$

Solve $5 + \sqrt{2x-1} = 12$

$5 + \sqrt{2x-1} = 12$

$\sqrt{2x-1} = 7$

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

$2x - 1 = 49$

$2x = 50$

$x = 25$

VERIFY!

$5 + \sqrt{2(25)-1} = 12$

$5 + \sqrt{50-1} = 12$

$5 + \sqrt{49} = 12$

$5 + 7 = 12$

$12 = 12$

:)

Extraneous Roots

a) What are the restrictions on n in the equation: $n - \sqrt{5-n} = -7$? The radical involves only real numbers.

$5 - n \geq 0$

$5 \geq n$

b) Solve by factoring the quadratic equation *(throwback to U3!)*

$n - \sqrt{5-n} = -7$

$n + 7 = \sqrt{5-n}$

$(n+7)^2 = (\sqrt{5-n})^2$

$n^2 + 14n + 49 = 5 - n$

$n^2 + 15n + 44 = 0$

STANDARD FORM QUADRATIC

$n^2 + 15n + 44 = 0$

$n^2 + 4n + 11n + 44 = 0$

$n(n+4) + 11(n+4) = 0$

$(n+11)(n+4) = 0$

$n + 11 = 0$

$n = -11$

$n + 4 = 0$

$n = -4$

c) Solve by using the Quadratic Formula *(throwback to U3!)*

Remember ... $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ } from U3!!

$n^2 + 15n + 44 = 0$

$a^2 + bx + c = 0$

$x = \dfrac{-15 \pm \sqrt{15^2 - 4(1)(44)}}{2(1)} = \dfrac{-15 \pm \sqrt{225 - 176}}{2}$

$x = \dfrac{-15 \pm \sqrt{49}}{2}$

$\dfrac{-15+7}{2} = \dfrac{-8}{2} = -4$

$\dfrac{-15-7}{2} = \dfrac{-22}{2} = -11$

Solving with Two Radicals

$$7 + \sqrt{3x} = \sqrt{5x+4} + 5$$

combine constants to simplify

$$7 + \sqrt{3x} = \sqrt{5x+4} + 5$$
$$-5 \qquad\qquad -5$$
$$2 + \sqrt{3x} = \sqrt{5x+4}$$

square to remove radicand

$$(2+\sqrt{3x})^2 = (\sqrt{5x+4})^2$$
$$4 + 4\sqrt{3x} + 3x = 5x + 4$$
$$-4 \qquad\qquad -4$$

SIMPLIFY!

$$4\sqrt{3x} + 3x = 5x$$
$$-3x \qquad -3x$$
$$4\sqrt{3x} = 2x$$
$$(4\sqrt{3x})^2 = (2x)^2$$
$$16(3x) = 4x^2$$
$$48x = 4x^2$$
$$0 = 4x^2 - 48x$$
$$0 = 4x(x-12)$$

find possibilities for ZEROES (same way we did in Unit 3!)

$4x = 0$
$x = 0$

$(x-12) = 0$
$x = 12$

PRACTICE: page 300 – Q 1, 3 (a,b), 4 (a,b), 7a, 8a, 9a, 10a, 14