Adding and Subtracting Radicals

How hard can adding be?

You just have to remember that you can't take the square root of a negative number! Not yet…

State the restriction:

$\sqrt{4-x}$ $4-x \geq 0$ $4 \geq x$	$\sqrt{x-3}$ $x-3 \geq 0$ $x \geq 3$

Solve:

$\sqrt{x+1}+3=5$

$x+1 \geq 0$
$x \geq -1$

Here are the steps you want to follow every time you have a radical in your expression:

1. Isolate the radical
   - ➢ Get the root alone on one side of the equation
2. Square both sides
   - ➢ This gets rid of the radical. Back to easy mode after this!
3. Solve for x
4. Check for extraneous roots
   - ➢ Sometimes you may find answers that are not allowed. Non Permissible Values (NPV)

$\sqrt{x+1} = 5-3$

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

$x+1 = 4$

$x = 3$ ✓

$x+1 \geq 0$
$x \geq -1$

$x=\sqrt{x+10}+2$

$(x-2)^2=(\sqrt{x+10})^2$

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

$x^2-4x+4=x+10$

$x^2-4x-x-10=0$

$1x^2-5x-6=0$

$x^2-6x+x-6$

-6
-5
$-6,1$

$x=6$

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

$(x-6)(x+1) = 0$

$x-6=0$ or $x+1=0$

$x=6$ ✓ $x=-1$ ✓

When you square both sides of an equation, you are destroying information about the signs of the two sides. Now we have a new equation. Both answers may work in that equation, but we need to check our original equation to see that it works in there too!

$x+2 \geq 0$

$x \geq -2$

$x - \sqrt{x+2} = 0$

$x = \sqrt{x+2}$

$x^2 = x+2$

$1x^2 - x - 2 = 0$

-2

-1

$(-2, +1)$

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

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

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

$x-2=0$ or $x+1=0$

$x=2$ $x=-1$

HW: pg: 300

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