Answers

PC 11 **RADICAL EQUATIONS**

	Solve	Check	Verify
1	$(\sqrt{x+4})^2 = (\sqrt{-x+1})^2$ $x+4 = -x+1$ $\frac{2x}{2} = \frac{-3}{2}$ $x = -\frac{3}{2}$ OR $x = -1.5$	$\sqrt{-1.5+4} = \sqrt{-(-1.5)+1}$ $\sqrt{2.5} = \sqrt{2.5}$ LS = RS ✓	Restrictions: $x+4 \geq 0$ $\quad -x+1 \geq 0$ $x \geq -4$ $\quad -x \geq -1$ $\quad x \leq 1$ $-1.5 \geq -4$ ✓✓ $\quad -1.5 \leq 1$ ✓✓ $\therefore x = -1.5$ is a valid solution.
2	$-4 + \sqrt{x+1} = 12$ $(\sqrt{x+1})^2 = 16^2$ $x+1 = 256$ $x = 255$	$-4+\sqrt{255+1} = 12$ $-4+\sqrt{256} = 12$ $-4+16 = 12$ $12 = 12$ LS = RS ✓	Restriction: $x+1 \geq 0$ $x \geq -1$ $255 \geq -1$ ✓✓ $\therefore$ 255 is a valid solution.
3	$\sqrt{x+5} - 1 = \sqrt{5+x}$ $\sqrt{x+5} - 1 = \sqrt{x+5}$ $-\sqrt{x+5} \quad -\sqrt{x+5}$ $0 - 1 = 0$ $\boxed{-1 = 0}$ ← False statement $\Rightarrow$ $\therefore$ There are no R solutions.		
4	$\sqrt{-x} + 4 = 10$ $-4 \quad -4$ $(\sqrt{-x})^2 = (6)^2$ $-x = 36$ $x = -36$	$\sqrt{-(-36)} + 4 = 10$ $\sqrt{36} + 4 = 10$ $6 + 4 = 10$ $10 = 10$ LS = RS ✓	Restriction: $-x \geq 0$ $x \leq 0$ $-36 \leq 0$ ✓✓ $\therefore x = -36$ is a valid solution

L4!

5 $\left(\sqrt{x}-5\right)^2=\left(\sqrt{x+2}\right)^2$

$(\sqrt{x}-5)(\sqrt{x}-5)=x+2$

$(\sqrt{x})^2-5\sqrt{x}-5\sqrt{x}+25=x+2$

$x-10\sqrt{x}+25=x+2$

$-10\sqrt{x}=-23$

$\sqrt{x}=2.3$

$(\sqrt{x})^2=(2.3)^2$

$x=5.29$

$\sqrt{5.29}-5=\sqrt{5.29}+2$

$2.3-5=2.7$

$-2.7\neq 2.7$

$LS\neq RS$

$\therefore x=5.29$ is an extraneous sol.

6 $\left(\sqrt{2-x}\right)^2=\left(x+4\right)^2$

$2-x=x^2+8x+16$

$0=x^2+9x+14$

$0=(x+7)(x+2)$

$x+7=0$ or $x+2=0$

$x=-7$ or $x=-2$

Check $x=-7$

$\sqrt{2-(-7)}=-7+4$

$\sqrt{9}=-3$

$3\neq -3$

$LS\neq RS$

Check $x=-2$

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

$\sqrt{4}=2$

$2=2\rightarrow LS=RS$ ✓

Restriction

$2-x\geq 0$

$-x\geq -2$

$x\leq 2$

$-2\leq 2$ ✓

$\therefore x=-2$ is a valid solution.

7 $x=\sqrt{4x+8}-3$

$\left(x+3\right)^2=\left(\sqrt{4x+8}\right)^2$

$x^2+6x+9=4x+8$

$-4x-8 \quad -4x-8$

$x^2+2x+1=0$

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

$x+1=0\rightarrow x=-1$

Check

$-1=\sqrt{4(-1)+8}-3$

$-1=\sqrt{-4+8}-3$

$-1=\sqrt{4}-3$

$-1=2-3$

$-1=-1$

$LS=RS$ ✓

Restriction

$4x+8\geq 0$

$\frac{4x}{4}\geq\frac{-8}{4}$

$x\geq -2$

$-1\geq -2$ ✓

$\therefore x=-1$ is a valid solution.

Answers: -1.5 , 255, no R solutions, -36, 5.29 a proposed solution but not a valid solution as LS≠RS, -2 is valid and -7 is extraneous, -1