

Answers

PC 11

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

L4!

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

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

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

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

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

$$\sqrt{x} = 2.3$$

$(\sqrt{x})^2 = (2.3)^2$
 $x = 5.29$

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

$$2.3 - 5 = 2.7$$

$$-2.7 \neq 2.7$$

$LS \neq RS$
 $\therefore x = 5.29$
is an extraneous sol.

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

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

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

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

\swarrow \searrow

$$x+7=0 \quad x+2=0$$

$$x=-7 \quad x=-2$$

Check $x=-7$

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

$$\sqrt{9} = -3$$

$$3 \neq -3$$

$LS \neq RS$

Check $x=-2$

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

$$\sqrt{4} = 2$$

$$2 = 2 \rightarrow LS=RS \checkmark$$

Restrictions

$$2-x \geq 0$$

$$\frac{-x \geq -2}{-1 \quad -1}$$

$$x \leq 2$$

$$-2 \leq 2 \checkmark$$

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

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

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

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

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

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

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

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

Check

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

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

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

$$-1 = 2 - 3$$

$$-1 = -1$$

$LS = RS \checkmark$

Restriction

$$4x+8 \geq 0$$

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

$$x \geq -2$$

$$-1 \geq -2 \checkmark$$

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

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