

Ecuaciones Racionales

Problema 44

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

Solución:

$$\sqrt{x-1} = 4 + \sqrt{x} \implies x-1 = 16+x+8\sqrt{x} \implies -17 = 8\sqrt{x} \implies x = \frac{289}{64} \text{ no vale}$$

Problema 45

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

Solución:

$$\sqrt{x-1} = x-2 \implies x-1 = x^2+4-4x \implies x^2-5x+5=0 \implies$$

$$\begin{cases} x = 3,618 \\ x = 1,382 \text{ No Vale} \end{cases}$$

Problema 46

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

Solución:

$$\sqrt{x-1} = 3 - \sqrt{x+1} \implies x-1 = 9+x+1-6\sqrt{x+1} \implies -11 = -6\sqrt{x+1} \implies x = \frac{85}{36}$$

Problema 47

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

Solución:

$$-\sqrt{x+2} = x-3 \implies x+2 = x^2+9-6x \implies x^2-7x+7=0 \implies$$

$$\begin{cases} x = 5,79129 \text{ No Vale} \\ x = 1,20871 \end{cases}$$

Problema 48

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

Solución:

$$\sqrt{x-3} = 4 - \sqrt{x} \implies x-3 = 16+x-8\sqrt{x} \implies -19 = -8\sqrt{x} \implies x = \frac{361}{64}$$

Problema 49

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

Solución:

$$x+4 = x^2+1-2x \implies x^2-3x-3=0 \implies$$

$$\begin{cases} x = 3,7912 \\ x = -0,79128 \text{ No Vale} \end{cases}$$

Problema 50

$$\sqrt{2x-1} + x = 8$$

Solución:

$$2x - 1 = 64 + x^2 - 16x \implies x^2 - 18x + 65 = 0 \implies$$

$$\begin{cases} x = 5 \\ x = 13 \text{ No Vale} \end{cases}$$

Problema 51

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

Solución:

$$x + 1 = 1 + x^2 - 2x \implies x^2 - 3x = 0 \implies x(x - 3) = 0$$

$$\begin{cases} x = 3 \\ x = 0 \text{ No Vale} \end{cases}$$

Problema 52

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

Solución:

$$\sqrt{2x+3} = 2 + \sqrt{x-2} \implies 2x+3 = 4+x-2+4\sqrt{x-2} \implies x+1 = -4\sqrt{x-2}$$

$$x^2 + 2x + 1 = 16x + 32 \implies x^2 - 14x + 33 = 0$$

$$\begin{cases} x = 3 \\ x = 11 \end{cases}$$

Problema 53

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

Solución:

$$3x - 5 = 1 + x^2 - 2x \implies x^2 - 5x + 6 = 0$$

$$\begin{cases} x = 3 \text{ No Vale} \\ x = 2 \text{ No Vale} \end{cases}$$

Problema 54

$$\sqrt{x^2-8} = x + 2$$

Solución:

$$x^2 - 8 = x^2 + 4x + 4 \implies x = -3 \text{ No Vale}$$

Problema 55 Halla las soluciones reales de:

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

Solución:

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

$$x + 6 = 16 + (\sqrt{2-x})^2 - 8\sqrt{2-x}$$

$$2x - 12 = -8\sqrt{2-x}$$

$$x - 6 = -4\sqrt{2-x}$$

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

$$x^2 + 36 - 12x = 16(2-x)$$

$$x^2 + 4x + 4 = 0 \implies x = \frac{-4 \pm \sqrt{16-16}}{2} = -2 \text{ doble}$$

Problema 56 Halla las soluciones reales de:

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

Solución:

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

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

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

$$-5 = -4\sqrt{x}$$

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

$$25 = 16x \implies x = \frac{25}{16}$$

Problema 57 Hallar las soluciones reales de:

$$\sqrt{x+7} + \sqrt{x} = 7$$

Solución:

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

$$x + 7 = 49 + x - 14\sqrt{x} \implies -42 = -14\sqrt{x} \implies 3 = \sqrt{x} \implies x = 9$$

Problema 58 Hallar las soluciones reales de:

$$\sqrt{x+6} + \sqrt{x} = 3$$

Solución:

$$\sqrt{x+6} + \sqrt{x} = 3 \implies \sqrt{x+6} = 3 - \sqrt{x} \implies (\sqrt{x+6})^2 = (3 - \sqrt{x})^2 \implies$$

$$x + 6 = 9 + x - 6\sqrt{x} \implies -3 = -6\sqrt{x} \implies \frac{1}{2} = \sqrt{x} \implies x = \frac{1}{4}$$

Problema 59 Hallar las soluciones reales de:

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

Solución:

$$\sqrt{x+1} - \sqrt{x-1} = 1 \implies \sqrt{x+1} = 1 + \sqrt{x-1} \implies$$

$$x + 1 = 1 + (x - 1) + 2\sqrt{x-1} \implies 1 = 4\sqrt{x-1} \implies x = \frac{5}{4}$$