

$$e) \frac{5}{x-3} - 1 = x$$

$$\frac{5 - 1 \cdot (x-3)}{x-3} = \frac{x \cdot (x-3)}{x-3}; \quad 5 - x + 3 = x^2 - 3x; \quad 8 - x = x^2 - 3x$$

$$x^2 - 3x - 8 + x = 0; \quad x^2 - 2x - 8 = 0 \quad \begin{cases} a = 1 \\ b = -2 \\ c = -8 \end{cases}$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4 \cdot 1 \cdot (-8)}}{2 \cdot 1} = \frac{2 \pm 6}{2} = \begin{cases} x_1 = \frac{2+6}{2} = 4 \\ x_2 = \frac{2-6}{2} = -2 \end{cases}$$

Comprobación,

$$x = 4 \rightarrow \frac{5}{4-3} - 1 = 4; \quad 4 = 4 \quad \text{Sí}$$

$$x = -2 \rightarrow \frac{5}{-2-3} - 1 = -2; \quad -2 = -2 \quad \text{Sí}$$

Soluciones: $x_1 = 4$ y $x_2 = -2$

$$h) \frac{7}{x+2} + 2 = \frac{9}{x-2}$$

$$\frac{(x+2)(x-2)}{(x+2)} = (x-2)$$

$$\text{mín.cm.}\{x+2, x-2\} = (x+2)(x-2)$$

$$\frac{(x+2)(x-2)}{(x-2)} = (x+2)$$

$$\frac{7(x-2) + 2(x+2)(x-2)}{(x+2)(x-2)} = \frac{9(x+2)}{(x+2)(x-2)}; \quad 7x - 14 + 2(x^2 - 4) = 9x + 18$$

$$7x - 14 + 2x^2 - 8 = 9x + 18; \quad 2x^2 + 7x - 22 = 9x + 18; \quad 2x^2 + 7x - 22 - 9x - 18 = 0$$

$$2x^2 - 2x - 40 = 0 \quad \begin{cases} a = 2 \\ b = -2 \\ c = -40 \end{cases} \quad x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4 \cdot 2 \cdot (-40)}}{2 \cdot 2} = \frac{2 \pm 18}{4} = \begin{cases} x_1 = \frac{2+18}{4} = 5 \\ x_2 = \frac{2-18}{4} = -4 \end{cases}$$

Comprobación:

$$x = 5; \quad \frac{7}{5+2} + 2 = \frac{9}{5-2}; \quad 3 = 3 \quad \text{Sí}$$

$$x = -4; \quad \frac{7}{-4+2} + 2 = \frac{9}{-4-2}; \quad \frac{-3}{2} = \frac{-3}{2} \quad \text{Sí}$$

Soluciones: $x_1 = 5$ y $x_2 = -4$

Ecuaciones con raíces cuadradas.

$$\sqrt{x^2 + 5} + 1 = 2x$$

$$\begin{array}{r} 2x \quad -1 \\ * \quad 2x \quad -1 \\ \hline -2x \quad +1 \\ 4x^2 \quad -2x \\ \hline 4x^2 \quad -4x \quad +1 \end{array}$$

$$\sqrt{x^2 + 5} = 2x - 1; \quad (\sqrt{x^2 + 5})^2 = (2x - 1)^2; \quad x^2 + 5 = 4x^2 - 4x + 1; \quad 4x^2 - 4x + 1 - x^2 - 5 = 0$$

$$3x^2 - 4x - 4 = 0; \quad \begin{cases} a = 3 \\ b = -4 \\ c = -4 \end{cases} \quad x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \cdot 3 \cdot (-4)}}{2 \cdot 3} = \frac{4 \pm 8}{6} = \begin{cases} x_1 = \frac{4+8}{6} = 2 \\ x_2 = \frac{4-8}{6} = \frac{-2}{3} \end{cases}$$

Comprobación:

$$x = 2; \quad \sqrt{2^2 + 5} + 1 = 2 \cdot 2; \quad 4 = 4 \quad \text{Sí}$$

$$x = \frac{-2}{3}; \quad \sqrt{\left(\frac{-2}{3}\right)^2 + 5} + 1 = 2 \cdot \frac{-2}{3}; \quad \frac{10}{3} = \frac{-4}{3} \quad \text{No}$$

Solución : $x = 2$

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

$$\begin{array}{r} x \quad -2 \\ * \quad x \quad -2 \\ \hline -2x \quad +4 \\ x^2 \quad -2x \\ \hline x^2 \quad -4x \quad +4 \end{array}$$

$$\sqrt{x} = x - 2; \quad (\sqrt{x})^2 = (x - 2)^2; \quad x = x^2 - 4x + 4; \quad x^2 - 4x + 4 - x = 0; \quad x^2 - 5x + 4 = 0 \quad \begin{cases} a = 1 \\ b = -5 \\ c = 4 \end{cases}$$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \cdot 1 \cdot 4}}{2 \cdot 1} = \frac{5 \pm 3}{2} = \begin{cases} x_1 = \frac{5+3}{2} = 4 \\ x_2 = \frac{5-3}{2} = 1 \end{cases}$$

Comprobación:

$$x = 4; \quad \sqrt{4} + 2 = 4; \quad 4 = 4 \quad \text{Sí}$$

$$x = 1; \quad \sqrt{1} + 2 = 1; \quad 3 = 1 \quad \text{No}$$

Solución : $x = 4$

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

$$\sqrt{x+1}=x-8+3; \quad \sqrt{x+1}=x-5; \quad (\sqrt{x+1})^2=(x-5)^2; \quad x+1=x^2-10x+25$$

$$\begin{array}{r} x \quad -5 \\ * \quad x \quad -5 \\ \hline -5x \quad +25 \\ x^2 \quad -5x \\ \hline x^2 \quad -10x \quad +25 \end{array}$$

$$x^2-10x+25-x-1=0; \quad x^2-11x+24=0 \quad \begin{cases} a=1 \\ b=-11 \\ c=24 \end{cases} \quad x = \frac{-(-11) \pm \sqrt{(-11)^2 - 4 \cdot 1 \cdot 24}}{2 \cdot 1} =$$

$$= \frac{11 \pm 5}{2} = \begin{cases} x_1 = \frac{11+5}{2} = 8 \\ x_2 = \frac{11-5}{2} = 3 \end{cases}$$

Comprobación:

$$x=8; \quad \sqrt{8+1}-3=8-8; \quad 0=0 \quad \text{Sí}$$

$$x=3; \quad \sqrt{3+1}-3=3-8; \quad -1=-5 \quad \text{No}$$

Solución: $x=8$

$$3\sqrt{x-1}=2x-11$$

$$(3\sqrt{x-1})^2=(2x-11)^2; \quad 9(x-1)=4x^2-44x+121; \quad 9x-9=4x^2-44x+121;$$

$$\begin{array}{r} 2x \quad -11 \\ * \quad 2x \quad -11 \\ \hline -22x \quad +121 \\ 4x^2 \quad -22x \\ \hline 4x^2 \quad -44x \quad +121 \end{array}$$

$$4x^2-44x+121-9x+9=0; \quad 4x^2-53x+130=0 \quad \begin{cases} a=4 \\ b=-53 \\ c=130 \end{cases} \quad x = \frac{-(-53) \pm \sqrt{(-53)^2 - 4 \cdot 4 \cdot 130}}{2 \cdot 4} =$$

$$= \frac{53 \pm 27}{8} = \begin{cases} x_1 = \frac{53+27}{8} = 10 \\ x_2 = \frac{53-27}{8} = \frac{13}{4} \end{cases}$$

Comprobación:

$$x=10; \quad 3\sqrt{10-1}=2 \cdot 10-11; \quad 9=9 \quad \text{Sí}$$

$$x=\frac{13}{4}; \quad 3\sqrt{\frac{13}{4}-1}=2 \cdot \frac{13}{4}-11; \quad \frac{9}{2}=-\frac{9}{2} \quad \text{No}$$

Solución: $x=10$

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6)

$$a) \frac{3-x}{2} - \frac{2(x-2)}{3} = 4 - \frac{7(2x-1)}{9}$$

$$\text{mín.c.m.}\{2,3,9\}=18$$

$$\frac{9(3-x)-12(x-2)}{18} = \frac{18 \cdot 4 - 2 \cdot 7(2x-1)}{18}; \quad 27-9x-12x+24=72-28x+14; \quad 51-21x=84-28x$$

$$-21x+28x=84-51; \quad 7x=33; \quad x=\frac{33}{7}$$

$$\text{Solución: } x=\frac{33}{7}$$

$$d) \frac{2x-3}{6} - \frac{3(x-1)}{4} - \frac{2(3-x)}{6} + \frac{5}{8} = 0$$

$$\text{mín.c.m.}\{6,4,8\}=24$$

$$\frac{4(2x-3)-18(x-1)-8(3-x)+15}{24} = \frac{0}{24}; \quad 8x-12-18x+18-24+8x+15=0; \quad -2x-3=0$$

$$-2x=3; \quad x=\frac{3}{-2} = \frac{-3}{2}$$

$$\text{Solución: } x=\frac{-3}{2}$$

7 a y c 9 c