Examen 2º Ctrl - 1ª Eval / 4º ESO - op B

1 $3\sqrt{x+3} - \sqrt{x-2} = 7$

$\left(3\sqrt{x+3}\right)^2 = \left(7+\sqrt{x-2}\right)^2$

$9(x+3) = 49 + (x-2) + 14\sqrt{x-2}$

$9x+27-49-x+2 = 14\sqrt{x-2}$

$8x-20 = 14\sqrt{x-2}$

$(4x-10)^2 = \left(7\sqrt{x-2}\right)^2$

$16x^2+100-80x = 49(x-2)$

$16x^2-80x-49x+100+98 = 0$

$\boxed{16x^2-129x-198=0}$

$x = \frac{129 \pm \sqrt{16641+12672}}{32}$

$x = \frac{129 \pm 63}{32} = \begin{cases} x_1 = \frac{192}{32} = \boxed{6 \text{ Si}} \\ x_2 = \frac{66}{32} = \frac{33}{16} \text{ No} \end{cases}$

Comprobación:

$3\sqrt{3+6} - \sqrt{6-2} = 7 \Rightarrow 7 = 7$ Si

2 $\frac{2(x-10)}{x^2-13x+30} = 1$

$2(x-10) = x^2-13x+30$

$2x-20 = x^2-13x+30$

$-x^2+15x-50 = 0$

$\boxed{x^2-15x+50=0}$

$x = \frac{+15 \pm \sqrt{225-200}}{2}$

$x = \frac{+15 \pm \sqrt{25}}{2} = \frac{+15 \pm 5}{2} = \begin{cases} \frac{20}{2} = 10 \text{ No} \\ \frac{10}{2} = \boxed{5 \text{ Si}} \end{cases}$

Comprobación (el denominado debe ser $\neq 0$)

$10^2-130+30 = 0 \Rightarrow$ No vale

$5^2-65+30 = -10 \Rightarrow$ Si vale

3 $\frac{\left(x-\frac{1}{2}\right)^2 - \left(\frac{2x-3}{2}-1\right)^2}{2} = 1$

$\left(\frac{2x-1}{2}\right)^2 - \left(\frac{2x-3-2}{2}\right)^2 = 2$

$\frac{4x^2+1-4x}{4} - \frac{4x^2+25-20x}{4} = 2$

$4x^2+1-4x-4x^2-25+20x = 8$

$16x = 32$

$x = \frac{32}{16}; \boxed{x=2}$

4 $34 - x^2 = \frac{225}{x^2}$

$34x^2 - x^4 = 225$

$-x^4+34x^2-225 = 0$

$\boxed{x^4-34x^2+225=0}$

$x^2 = t$

$t^2-34t+225 = 0$

$t = \frac{34 \pm \sqrt{1156-900}}{2} = \frac{34+16}{2} \begin{cases} 25 \\ 9 \end{cases}$

Si $t=25 \Rightarrow x^2=25 \Rightarrow \begin{cases} x_1 = +5 \\ x_2 = -5 \end{cases}$

Si $t=9 \Rightarrow x^2=9 \Rightarrow \begin{cases} x_3 = +3 \\ x_4 = -3 \end{cases}$

5 $\frac{x}{5}\left(x+\frac{1}{6}\right) = x-1$

$\frac{x^2}{5} + \frac{x}{30} = x-1$

$6x^2+x = 30x-30$

$\boxed{6x^2-29x+30=0}$

$x = \frac{29 \pm \sqrt{841-720}}{12}$

$x = \frac{29 \pm \sqrt{121}}{12} = \begin{cases} \frac{29+11}{12} = \boxed{\frac{10}{3}} \\ \frac{29-11}{12} = \boxed{\frac{3}{2}} \end{cases}$

7) $\left.\begin{array}{l} 2x^2+3y^2=11 \\ xy=2 \end{array}\right\} \rightarrow y=\frac{2}{x}$

$2x^2+3\left(\frac{2}{x}\right)^2=11$

$2x^2+\frac{12}{x^2}=11$

$2x^4+12=11x^2$

$\boxed{2x^4-11x^2+12=0}$

Cambio $\boxed{x^2=t}$

$2t^2-11t+12=0$

$t=\frac{11\pm\sqrt{121-96}}{4}=\frac{11\pm\sqrt{25}}{4}=\begin{cases}\frac{11+5}{4}=4\\ \frac{11-5}{4}=\frac{3}{2}\end{cases}$

Si $t=4 \Rightarrow x^2=4 \Rightarrow \begin{cases} x_1=+2 \\ x_2=-2 \end{cases}$

Si $t=\frac{3}{2} \Rightarrow x^2=\frac{3}{2} \Rightarrow \begin{cases} x_3=+\sqrt{\frac{3}{2}}=+\frac{\sqrt{6}}{2} \\ x_4=-\sqrt{\frac{3}{2}}=-\frac{\sqrt{6}}{2} \end{cases}$

Para $x_1=2$ entonces $y=\frac{2}{2} \rightarrow (2,1)$

Para $x_2=-2$ entonces $y=\frac{2}{-2} \rightarrow (-2,-1)$

Para $x_3=\frac{\sqrt{6}}{2}$ entonces $y=\frac{2}{\frac{\sqrt{6}}{2}} \rightarrow \left(\frac{\sqrt{6}}{2}, \frac{2\sqrt{6}}{3}\right)$

Para $x_4=-\frac{\sqrt{6}}{2}$ entonces $y=\frac{2}{-\frac{\sqrt{6}}{2}} \rightarrow \left(-\frac{\sqrt{6}}{2}, -\frac{2\sqrt{6}}{3}\right)$

6) $\left.\begin{array}{l} \frac{3-2y}{4}-\frac{1}{4}=\frac{1-2x}{6} \\ \frac{25}{8}=\frac{x+3}{2}-\frac{3(1+y)}{8}+1 \end{array}\right\}$

1ª) $3(3-2y)-3=2(1-2x)$

$9-6y-3=2-4x$

$4x-6y=-4$

$\boxed{2x-3y=-2}$

2ª) $25=4(x+3)-3(1+y)+8$

$25=4x+12-3-3y+8$

$-4x+3y=-25+12-3+8$

$\boxed{-4x+3y=-8}$

$\left.\begin{array}{l} 2x-3y=-2 \\ -4x+3y=-8 \end{array}\right\}$

Reducción

$(\cdot 2)$ $\left.\begin{array}{l} 4x-6y=-4 \\ -4x+3y=-8 \end{array}\right\}$

$-3y=-12$

$y=\frac{-12}{-3}=4$

$2x-12=-2$

$2x=10$

$x=\frac{10}{2}=5$

$\Rightarrow$ Solución $(5,4)$

1ª) $y=\frac{-2-2x}{-3}=\frac{2x+2}{3}$

x	y
2	2
-4	-2

2ª) $y=\frac{4x-8}{3}$

x	y
2	0
-1	-4