P1| Resuelva:

(1) $x^2 - 3x + 1 \leq 3x - 4$

(2) $\frac{x}{3} - 4 \leq \frac{x}{4} - 3$

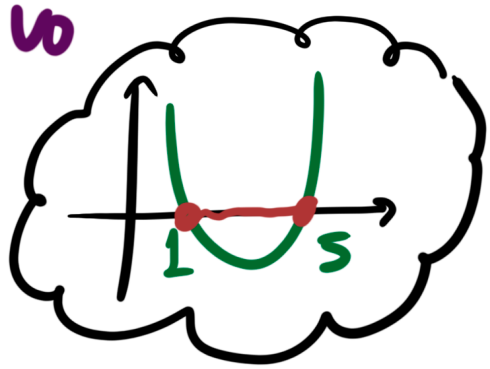
Sol: veamos (1):

$$x^2 - 3x + 1 \leq 3x - 4 \quad / -3x + 4$$

$$\Leftrightarrow x^2 - 6x + 5 \leq 0$$

$$\Leftrightarrow (x-5)(x-1) \leq 0$$

coeficiente positivo



$$S_1 = [1, 5] /$$

Ahora (2):

$$\frac{x}{3} - 4 \leq \frac{x}{4} - 3 \quad / -\frac{x}{4} + 4$$

$$x\left(\frac{1}{3} - \frac{1}{4}\right) \leq 1 \Leftrightarrow x \cdot \frac{1}{12} \leq 1 \quad / \cdot 12$$

(70)

$$\Leftrightarrow x \leq 12 \rightarrow S_2 =]-\infty, 12] /$$

Luego: → debe cumplir AMBOS.

$$S_f = S_1 \cap S_2 = [1, 5] //$$

P2| $U(x) = (120-x)(x-20)$

buscamos $U > 1.600$

Sol:

$(120-x)(x-20) > 1.600$

$\Leftrightarrow -x^2 + 140x - 2400 > 1.600$

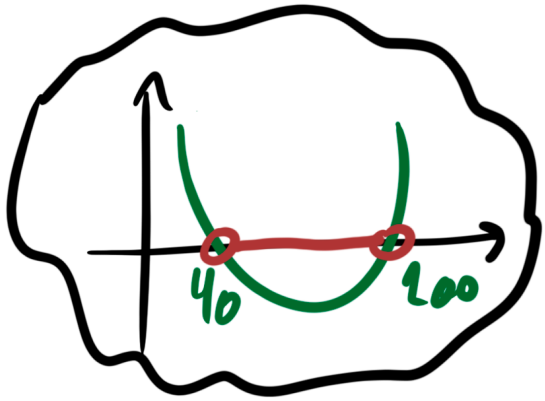
$\Leftrightarrow -x^2 + 140x - 4.000 > 0$

$\Leftrightarrow -(x^2 - 140x + 4000) > 0$

$\Leftrightarrow -(x-100)(x-40) > 0 \quad / \cdot -1 \ (<0)$

$\Leftrightarrow (x-100)(x-40) < 0$

$x \in]40, 100[$



El producto se debe vender entre $40.000 y $100.000.

P3| $|x^2-(3x-7)| \leq 8$

Sol: note que $x^2-(3x-7)$

$= x^2-3x+7 = x^2-2\frac{3}{2}x+7$

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

$=\left(x-\frac{3}{2}\right)^2-\frac{9}{4}+7=\left(x-\frac{3}{2}\right)^2+\frac{19}{4}$

y vemos que $\left(x-\frac{3}{2}\right)^2+\frac{19}{4}>0$

por lo que $\left|\left(x-\frac{3}{2}\right)^2+\frac{19}{4}\right| = \left(x-\frac{3}{2}\right)^2+\frac{19}{4}$

La inecuación queda:

$\left(x-\frac{3}{2}\right)^2+\frac{19}{4} \leq 8 \quad /-\frac{19}{4}$

$\Leftrightarrow \left(x-\frac{3}{2}\right)^2 \leq \frac{13}{4} \quad /\sqrt{\ }$ ↳ Ambos lados son ≥ 0.

$\Leftrightarrow \sqrt{\left(x-\frac{3}{2}\right)^2} \leq \frac{\sqrt{13}}{2}$

$\Leftrightarrow \left|x-\frac{3}{2}\right| \leq \frac{\sqrt{13}}{2} \rightsquigarrow x \in \left[\frac{3}{2}-\frac{\sqrt{13}}{2}, \frac{3}{2}+\frac{\sqrt{13}}{2}\right]$

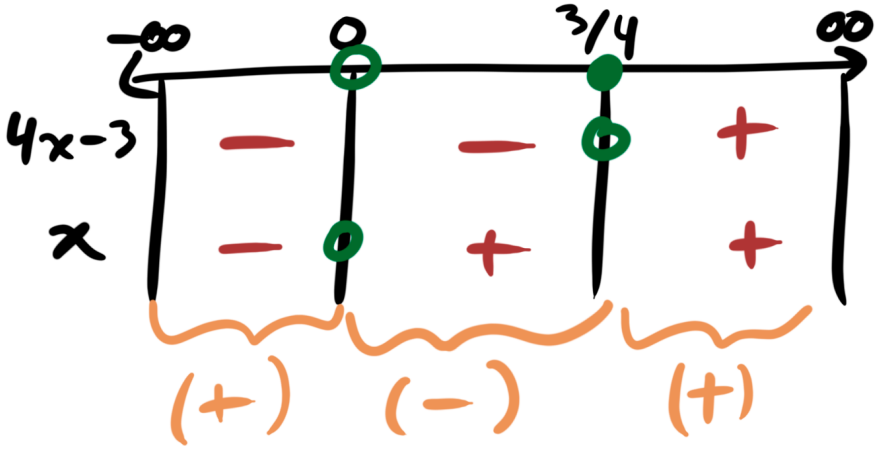
P4 a) $\frac{4x-3}{6x} \leq \frac{8x-6}{5x} \quad / \cdot 30$

$\Leftrightarrow \frac{5(4x-3)}{x} \leq \frac{6(8x-6)}{x} \quad / - \frac{6(8x-6)}{x}$

$\Leftrightarrow \frac{(20x-15)-(48x-36)}{x} \leq 0$

$\Leftrightarrow \frac{-28x+21}{x} \leq 0 \quad / \cdot \frac{-1}{7}$

$\Leftrightarrow \frac{4x-3}{x} \geq 0$ P.C: $x=0$, $x=\frac{3}{4}$

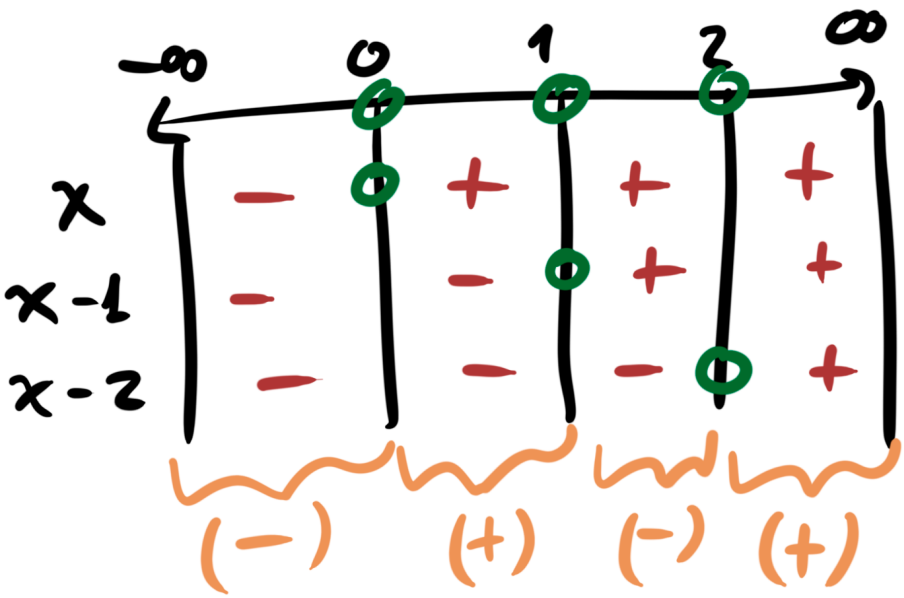


$x \in]-\infty, 0[\cup [\frac{3}{4}, \infty[$

b) $\dfrac{x^9+x}{x^2-3x+2} < 0$

$\Leftrightarrow \dfrac{x(x^8+1)}{(x-2)(x-1)} < 0 \quad / \cdot \dfrac{1}{x^8+1} \; (>0)$

$\Leftrightarrow \dfrac{x}{(x-2)(x-1)} < 0$ P.C: $x=0$, $x=1$, $x=2$



$x \in]-\infty, 0[\cup]1, 2[$ //