

EJERCICIO 4.2.

$$x^3 - 3x - 2 \geq 0$$

* Hallamos los ceros y factorizamos $P(x) = x^3 - 3x - 2$

Posibles raíces enteras = $\text{Div}(-2) = \{ \pm 1 ; \pm 2 \}$

$$\begin{array}{r|rrrr}
 & 1 & 0 & -3 & -2 \\
 -1 & & -1 & +1 & +2 \\
 \hline
 & 1 & -1 & -2 & \underline{0}
 \end{array}
 \rightarrow -1 \text{ es raíz y } \rightarrow P(x) = (x+1) \cdot (x^2 - x - 2)$$

(x+1) factor

$$x^2 - x - 2 = 0$$

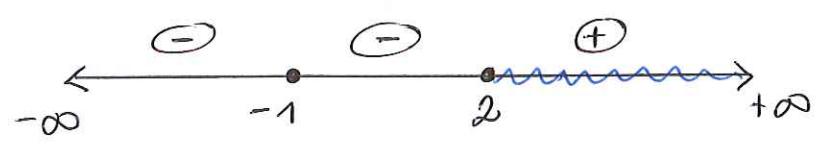
$$x = \frac{1 \pm \sqrt{1+8}}{2} = \frac{1 \pm 3}{2}$$

↗ 2 es raíz y (x-2) factor
↘ -1 es raíz y (x+1) factor

Por tanto

$$\boxed{
 \begin{array}{l}
 P(x) = (x+1)^2 \cdot (x-2) \\
 \text{CEROS} = \{ -1(\text{doble}), 2 \}
 \end{array}
 }$$

* La inecuación es equivalente a $\boxed{(x+1)^2 \cdot (x-2) \geq 0}$



$$x = -2 \rightarrow (+) \cdot (-) = (-)$$

$$x = 3 \rightarrow (+) \cdot (+) = (+)$$

$$x = 0 \rightarrow (+) \cdot (-) = (-)$$

Solución

$$\boxed{x \in \{ -1 \} \cup [2, +\infty)}$$

EJERCICIO 5.18

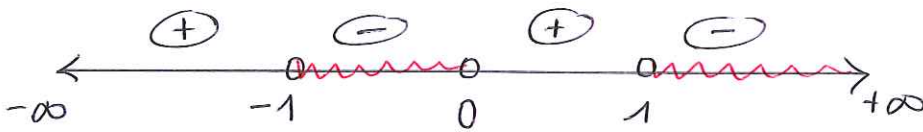
$$\frac{x-1}{x+1} < \frac{x+1}{x-1} \Rightarrow \frac{x-1}{x+1} - \frac{x+1}{x-1} < 0 \Rightarrow$$

$$\Rightarrow \frac{(x-1)^2 - (x+1)^2}{(x+1)(x-1)} < 0 \Rightarrow \frac{(x^2 - 2x + 1) - (x^2 + 2x + 1)}{(x+1)(x-1)} < 0 \Rightarrow$$

$$\Rightarrow \boxed{\frac{-4x}{(x+1)(x-1)} < 0}$$

* CEROS | $-4x = 0 \Rightarrow x = 0$

* POLOS | $(x+1)(x-1) = 0 \Rightarrow x = -1$ y $x = 1$



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

$$x = 0.5 \Rightarrow \frac{(-)}{(+)(-)} = \oplus$$

$$x = -0.5 \Rightarrow \frac{(+)}{(+)(-)} = \ominus$$

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

Solución $\boxed{x \in (-1, 0) \cup (1, +\infty)}$

EJERCICIO 6.3.

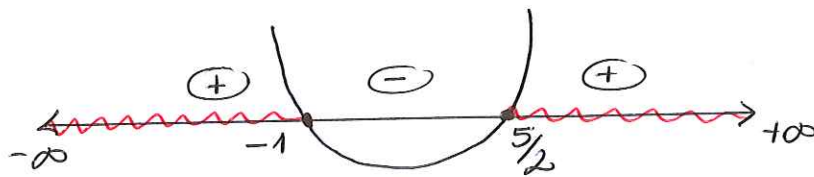
$$\left. \begin{array}{l} 2x^2 - 3x \geq 5 \\ x - 1 < 3x + 2 \end{array} \right\}$$

① $2x^2 - 3x \geq 5 \rightarrow \boxed{2x^2 - 3x - 5 \geq 0}$

* CEROS $2x^2 - 3x - 5 = 0$

$$x = \frac{3 \pm \sqrt{9 + 40}}{4} = \frac{3 \pm 7}{4} \rightarrow \begin{array}{l} x = 5/2 \\ x = -1 \end{array}$$

* $a = 2 > 0 \rightarrow$ cóncava hacia arriba



SOLUCIÓN $\boxed{x \in (-\infty, -1] \cup [5/2, +\infty)}$

② $x - 1 < 3x + 2$

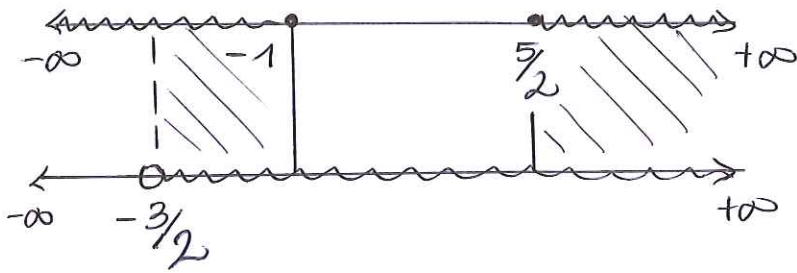
$$x - 3x < 1 + 2$$

$$-2x < 3$$

$x > -3/2$ \rightarrow SOLUCIÓN $\boxed{x \in (-3/2, +\infty)}$

SOLUCIÓN DEL SISTEMA

$$S = S_1 \cap S_2$$



$$\text{Solución } x \in \left(-\frac{3}{2}, -1\right] \cup \left[\frac{5}{2}, +\infty\right)$$

PROBLEMA 8

$$8x^2 - (m-1)x + m-7 = 0$$

$$\begin{aligned} \hookrightarrow a &= 8 & b &= -(m-1) & c &= m-7 \\ & & b &= 1-m & & \end{aligned}$$

La ecuación no tiene solución real $\Leftrightarrow b^2 - 4 \cdot a \cdot c < 0$

$$(1-m)^2 - 4 \cdot 8 \cdot (m-7) < 0$$

$$1 - 2m + m^2 - 32m + 224 < 0$$

$$m^2 - 34m + 225 < 0$$

* CEROS $m^2 - 34m + 225 = 0 \rightarrow m = \frac{34 \pm \sqrt{1156 - 900}}{2} = \frac{34 \pm 16}{2}$ $\begin{matrix} \uparrow (25) \\ \downarrow (9) \end{matrix}$

* $a = 1 > 0 \rightarrow \cup$ cóncava hacia arriba



$$\text{Solución } m \in (9, 25)$$