3. Hallar el conjunto de positividad (C^+) del polinomio $P(x) = x^4 + 3x^3 - 10x^2$

$C^+ = \{x \in \mathbb{R} \mid f(x) > 0\}$

$C^0 = \{x \in \mathbb{R} \mid f(x) = 0\}$

$C^- = \{x \in \mathbb{R} \mid f(x) < 0\}$

$P(x) = x^4 + 3x^3 - 10x^2$

$0 = x^4 + 3x^3 - 10x^2$

$0 = x^2(x^2 + 3x - 10)$

$\sqrt{x^2} = \sqrt{0}$

$|x| = 0$

$\boxed{x = 0}$

$x^2 + 3x - 10 = 0$

$a = 1 \; ; \; b = 3 \; , \; c = -10$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-(3) \pm \sqrt{(3)^2 - 4(1)(-10)}}{2(1)}$$

$$\frac{-(3) \pm \sqrt{(3)^2 - 4(1)(-10)}}{2(1)}$$

$$\frac{-3 \pm \sqrt{9 + 40}}{2}$$

$$\frac{-3 \pm \sqrt{49}}{2}$$

$$\frac{-3 \pm 7}{2}$$

$$\frac{-3 + 7}{2} \qquad \frac{-3 - 7}{2}$$

$$\frac{4}{2} \qquad \frac{-10}{2}$$

$\boxed{2}$ $\qquad$ $\boxed{-5}$

$\boxed{C^0 = \{0, 2, -5\}}$

$(-\infty; -5) \quad (-5; 0) \quad (0; 2) \quad (2; +\infty)$

$$P(x) = x^4 + 3x^3 - 10x^2$$

$X = -6$ $\quad P(-6) = (-6)^4 + 3(-6)^3 - 10(-6)^2 = +288$ ✓

$X = -1$ $\quad P(-1) = (-1)^4 + 3(-1)^3 - 10(-1)^2 = -12$ ✗

$X = 1$ $\quad P(1) = (1)^4 + 3(1)^3 - 10(1)^2 = -6$ ✗

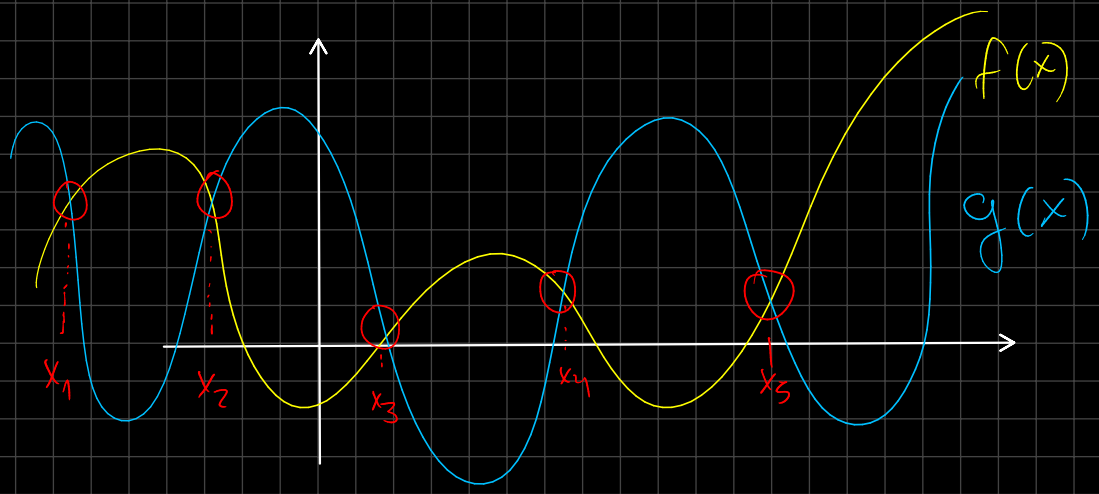
$X = 4$ $\quad P(4) = (4)^4 + 3(4)^3 - 10(4)^2 = +288$ ✓

$$C^+ = (-\infty; -5) \cup (2; +\infty)$$

2. Hallar el conjunto de positividad (C^+) del polinomio $P(x) = x^4 - 2x^3 - 8x^2$

2. Hallar analíticamente los puntos del plano donde se cortan las funciones:

$$f(x) = -x^3 + 2x^2 - x - 1 \quad , \quad g(x) = -x^3 + x + 11$$



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Puntos de corte $\rightarrow$ $f(x) = g(x)$

$$-x^3 + 2x^2 - x - 1 = -x^3 + x + 11$$

$$-x^3 + 2x^2 - x - 1 + x^3 - x - 11 = 0$$

$$2x^2 - 2x - 12 = 0$$

$a = 2 \qquad b = -2 \qquad c = -12$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-(-2) \pm \sqrt{(-2)^2 - 4(2)(-12)}}{2(2)}$$

$$\frac{-(-2) \pm \sqrt{(-2)^2 - 4(2)(-12)}}{2(2)}$$

$$\frac{2 \pm \sqrt{4 + 96}}{4}$$

$$\frac{2 \pm \sqrt{100}}{4}$$

$$\frac{2 \pm 10}{4}$$

$$\frac{2 + 10}{4} = \frac{12}{4} = \boxed{3}$$

$$\frac{2 - 10}{4} = \frac{-8}{4} = \boxed{-2}$$

Solución Final $x_1 = 3$ y $x = 2$

$$\frac{9x+3}{4x-2} \geq 2$$

$(4x-2)\cdot 1 = 4x-2$

$$\frac{1\cdot(9x+3)}{1\cdot(4x-2)} - \frac{2(4x-2)}{1(4x-2)} \geq 0$$

$$\frac{9x+3}{4x-2} - \frac{2(4x-2)}{4x-2} \geq 0$$

$$\frac{9x+3-2(4x-2)}{4x-2} \geq 0$$

$$\frac{9x+3-8x+4}{4x-2} \geq 0$$

$$\frac{x+7}{4x-2} \geq 0$$

Pontos Críticos

$x+7=0$

$\boxed{x=-7}$

$4x-2=0$

$4x=2$

$x=\frac{2}{4}$

$\boxed{x=\frac{1}{2}}$

$(-\infty;-7)$ $(-7;1/2)$ $(\frac{1}{2};+\infty)$