

INECUACIONES

①

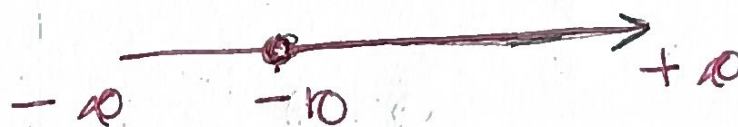
$$a) \frac{x-3}{2} - \frac{x-2}{8} \leq \frac{x}{2}$$

$$4x - 12 - x + 2 \leq 4x$$

$$-x \leq 10$$

$$x \geq -10$$

$$x \in [-10, +\infty)$$



$$b) 2x - 3 - \frac{x}{2} > x + \frac{3x+1}{6}$$

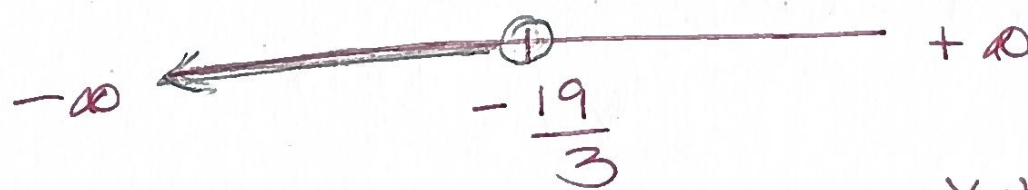
$$12x - 18 - 3x > 6x + 3x + 1$$

$$\cancel{12}x - 3x - \cancel{6}x - \cancel{6}x > 1 + 18$$

$$-3x > 19$$

$$x < -\frac{19}{3}$$

$$x \in (-\infty, -\frac{19}{3})$$



$$c) x + 2(x+1) + 3(x+2) < \frac{x+38}{2}$$

$$2x + 4x + 4 + 6x + 12 < x + 38$$

$$11x < 22$$

$$x < 2$$

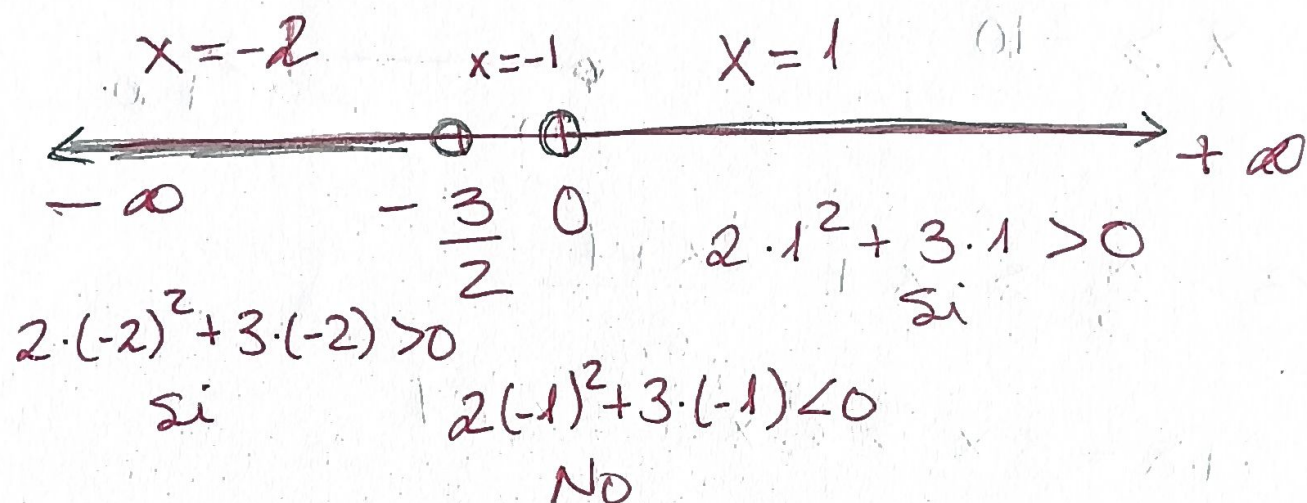


$$x \in (-\infty, 2)$$

$$d) \quad 2x^2 + 3x > 0$$

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

$$x(2x+3) = 0 \quad \begin{cases} x=0 \\ 2x+3=0 \Rightarrow x = -\frac{3}{2} \end{cases}$$

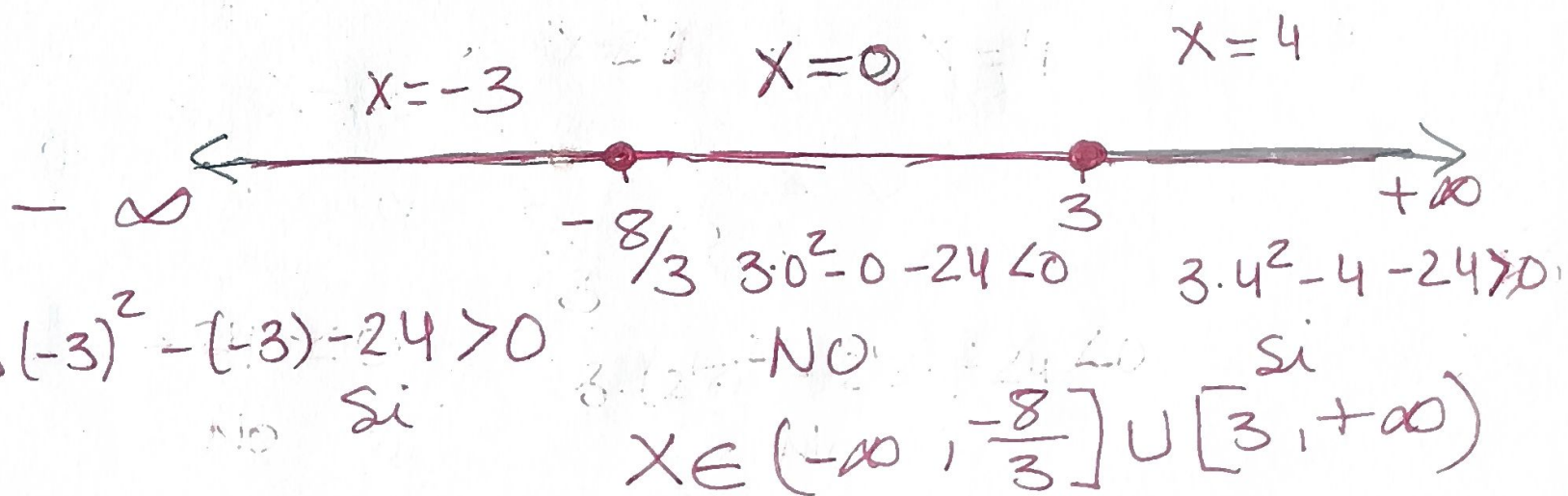


$$\text{Solución: } x \in \left(-\infty, -\frac{3}{2}\right) \cup (0, +\infty)$$

$$e) \quad 3x^2 - x - 24 \geq 0$$

$$3x^2 - x - 24 = 0$$

$$x = \frac{1 \pm \sqrt{1 + 288}}{6} = \begin{cases} x_1 = \frac{1+17}{6} = 3 \\ x_2 = \frac{1-17}{6} = -\frac{8}{3} \end{cases}$$



$$x \in \left(-\infty, -\frac{8}{3}\right] \cup [3, +\infty)$$

$$f) x^3 - 4x > 0$$

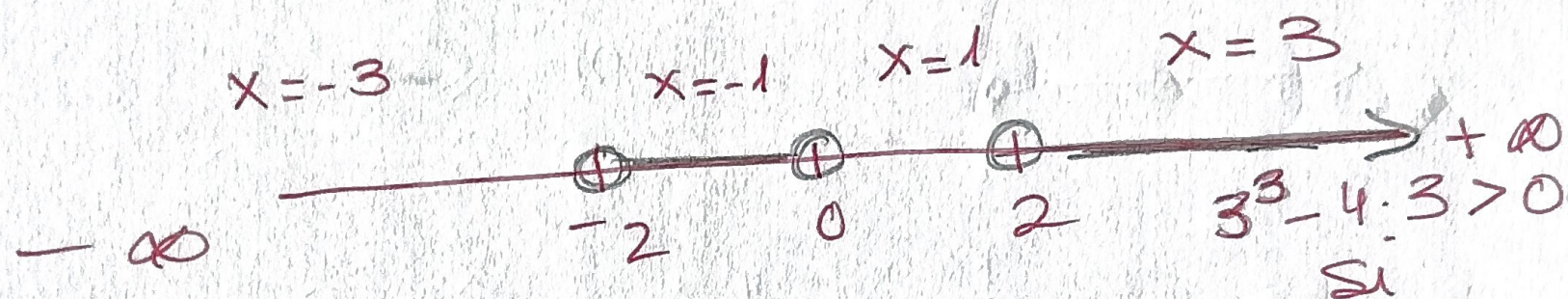
$$x^3 - 4x = 0$$

$$x = 0$$

$$x(x^2 - 4) = 0$$

$$x^2 - 4 = 0$$

$$x = \pm 2$$



$$(-3)^3 - 4(-3) < 0$$

No

$$(-1)^3 - 4(-1) > 0$$

$$1^3 - 4(1) < 0$$

No

$$x \in (-2, 0) \cup (2, +\infty)$$

$$g) x^3 + x^2 - x - 1 \leq 0$$

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

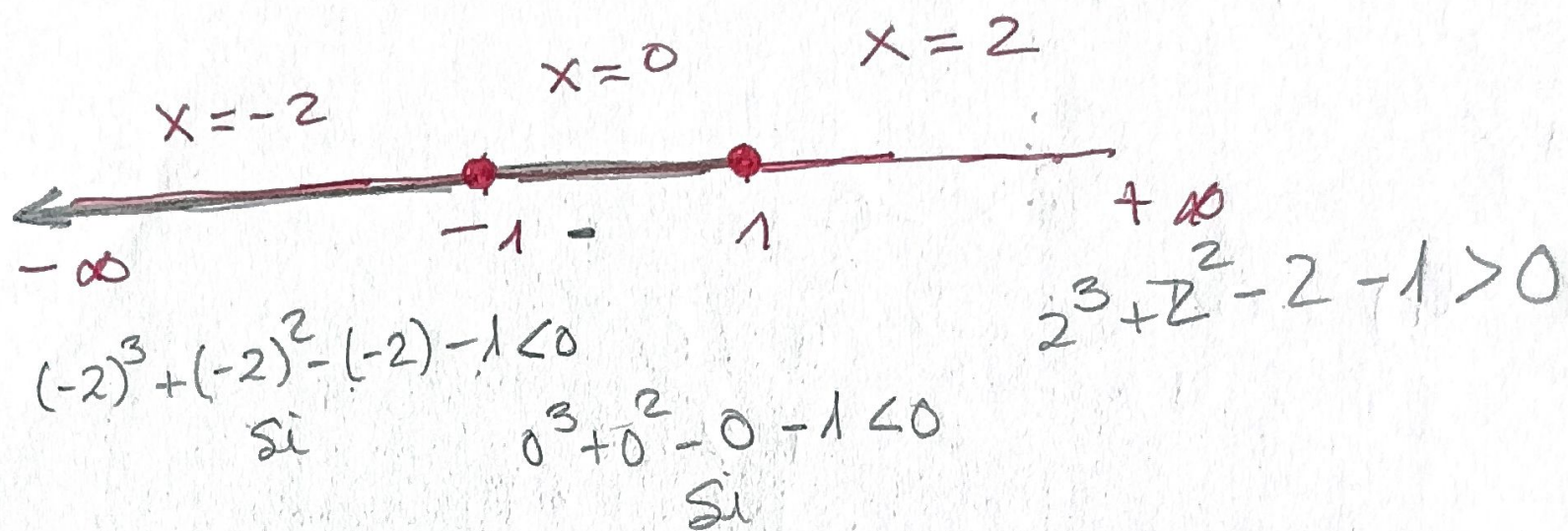
	1	1	-1	-1	$x_1 = 1$
1	1	1	2	1	
	1	2	1	0	

$$x^2 + 2x + 1 = 0$$

$$x = \frac{-2 \pm \sqrt{4 - 4}}{2} = -1$$

$$x_2 = -1 \text{ solución doble.}$$



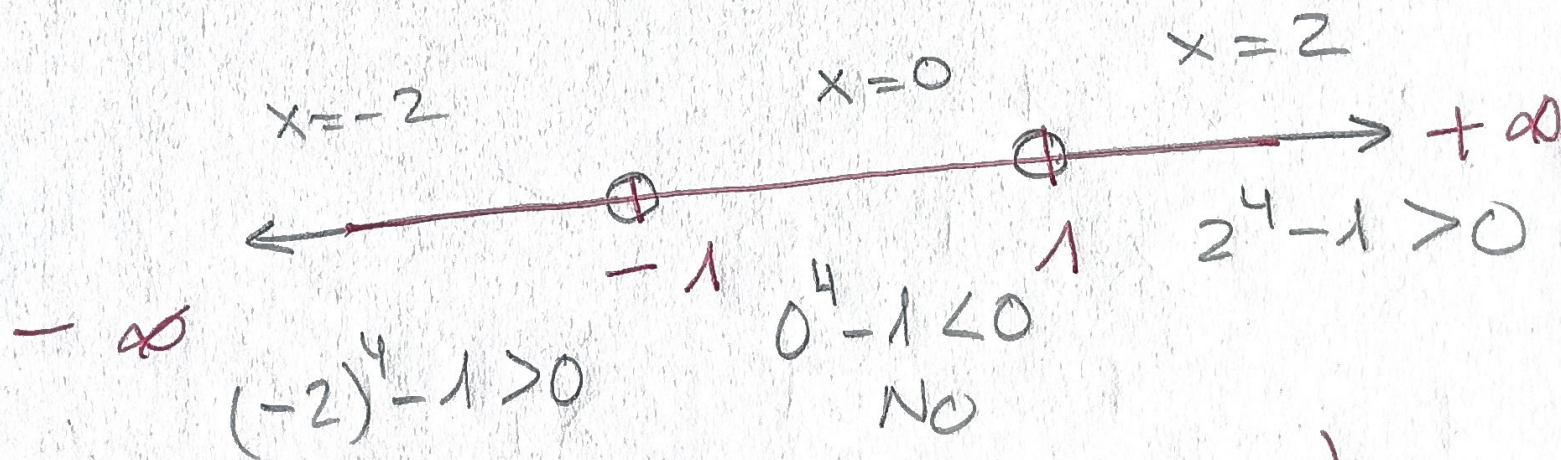


$$x \in (-\infty, 1]$$

h) $x^4 - 1 > 0$

$$x^4 - 1 = 0$$

$$x = \pm 1$$



$$x \in (-\infty, -1) \cup (1, +\infty)$$

$$i) (x-1)(x+4) < -6$$

$$x^2 + 4x - x - 4 + 6 < 0$$

$$x^2 + 3x + 2 < 0$$

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

$$x = \frac{-3 \pm \sqrt{9-8}}{2} = \begin{cases} x_1 = -1 \\ x_2 = -2 \end{cases}$$

$x = -3$	$x = -1.5$	$x = 0$	$+\infty$
$-\infty$	-2	-1	
$(-3-1) \cdot (-3+4) < -6$	$(-1.5-1) \cdot (-1.5+4) < -6$	$(-1)(4) < -6$	$-4 < -6$
$-4 < -6$	$-2.5 \cdot (+2.5) < -6$		NO
NO		$-6.25 < -6$	

$$x \in (-2, -1)$$

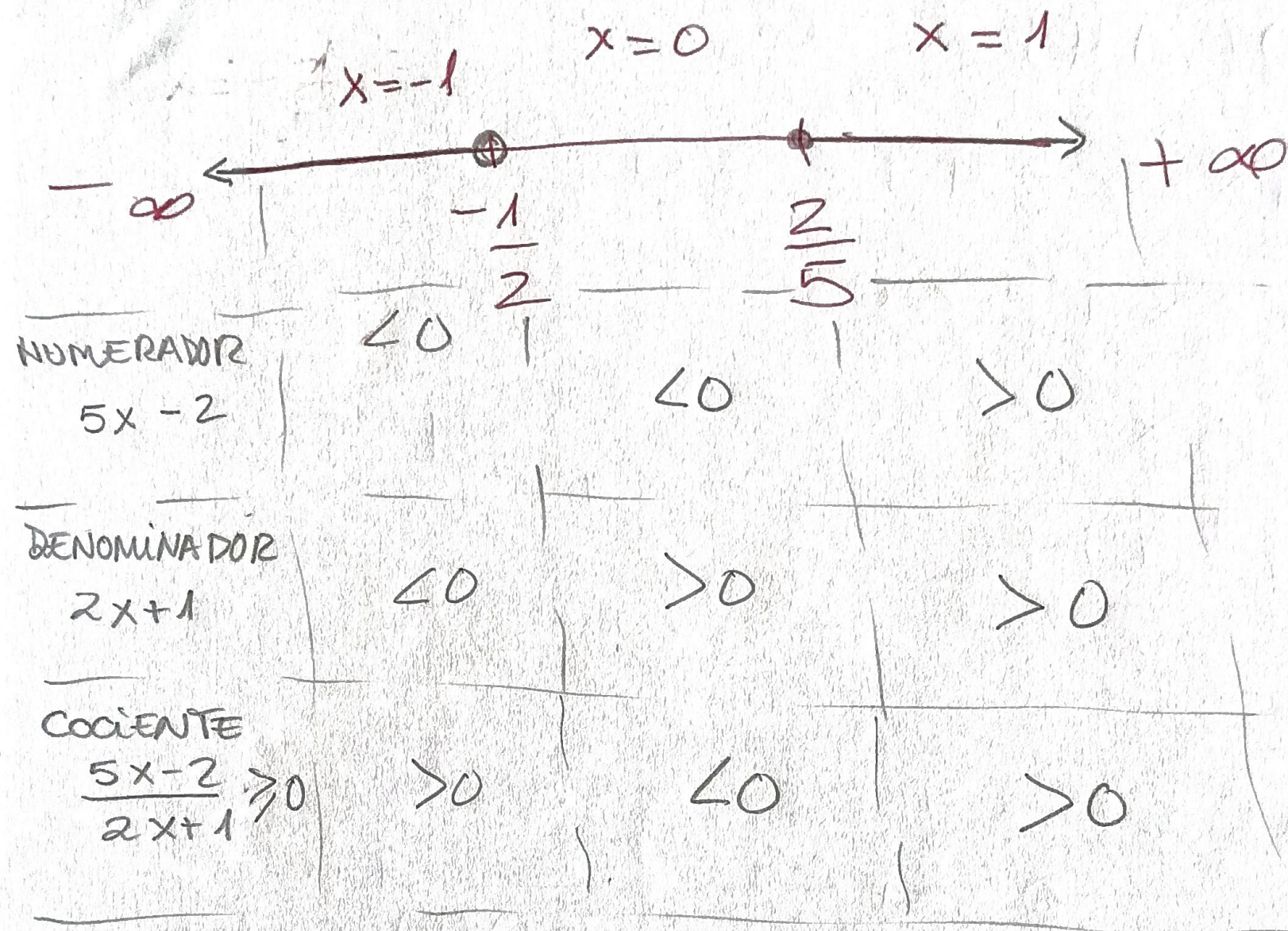
$$j) \frac{5x-2}{2x+1} \geq 0$$

$$5x - 2 = 0$$

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

$$2x + 1 = 0$$

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



$$x \in (-\infty, -\frac{1}{2}) \cup [\frac{2}{5}, +\infty)$$

$$k) \frac{x^2 - x - 2}{x^2 + x - 2} \geq 0$$

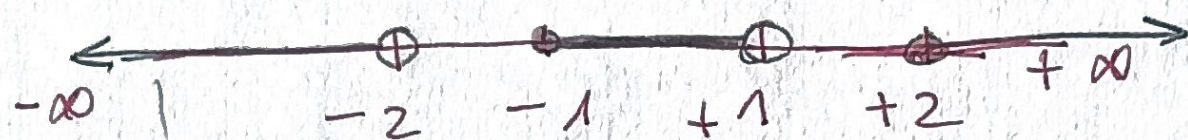
$$x^2 - x - 2 = 0$$

$$x = \frac{-1 \pm \sqrt{1+8}}{2} = \begin{cases} x_1 = \frac{1+3}{2} = 2 \\ x_2 = \frac{1-3}{2} = -1 \end{cases}$$

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

$$x = \frac{-1 \pm \sqrt{1+8}}{2} = \begin{cases} x_1 = \frac{-1+3}{2} = 1 \\ x_2 = \frac{-1-3}{2} = -2 \end{cases}$$

$$x = -3 \quad x = -1/5 \quad x = 0 \quad x = 1/5 \quad x = 3$$



NUM $x^2 - x - 2$	> 0	> 0	< 0	< 0	> 0
DENO $x^2 + x - 2$	> 0	< 0	< 0	> 0	> 0
COCIENTE $\frac{x^2 - x - 2}{x^2 + x - 2} \geq 0$	> 0 Si	< 0	> 0 Si	< 0	> 0 Si

$$x \in (-\infty, -2) \cup [-1, 1) \cup [2, +\infty)$$

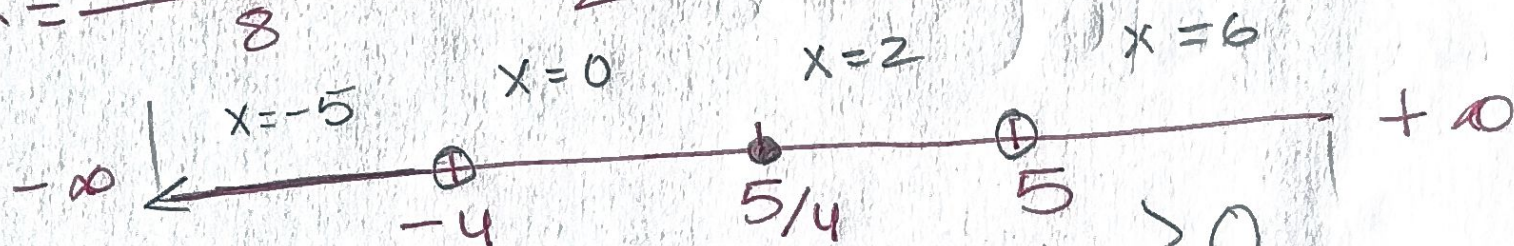
$$1) \frac{4x - 5}{4x^2 - x - 5} < 0$$

$$4x - 5 = 0$$

$$x = \frac{5}{4}$$

$$4x^2 - x - 5 = 0$$

$$x = \frac{1 \pm \sqrt{1 + 80}}{8} = \frac{1 \pm 9}{2} = \begin{cases} x_1 = 5 \\ x_2 = -4 \end{cases}$$



NUM $4x - 5$	< 0	< 0	> 0	> 0
DENO $4x^2 - x - 5$	> 0	< 0	> 0	> 0
COCIENTE $\frac{4x - 5}{4x^2 - x - 5} < 0$	< 0	> 0	> 0	> 0

Solución $x \in (-\infty, -4)$

$$m) \frac{x^3}{x^2 - 9} \geq 0$$

$$x^3 = 0 \quad x = 0$$

$$x^2 - 9 = 0 \Rightarrow x = \pm 3$$

	$-\infty$	$x = -4$	$x = -1$	$x = 1$	$x = 4$	$+\infty$
		$\oplus$	$\oplus$	$\oplus$	$\oplus$	
		-3	0	3		
NUM x^3		< 0	< 0	> 0	> 0	
DEN $x^2 - 9$		> 0	< 0	< 0	> 0	
COCI $\frac{x^3}{x^2 - 9}$		< 0	> 0	< 0	> 0	

$$x \in (-3, 0] \cup (3, +\infty)$$

n) $\frac{x^2 + 4x - 5}{x^3 - x} \geq 0$

5

$$x^2 + 4x - 5 = 0$$

$$x = \frac{-4 \pm \sqrt{16 + 20}}{2} = \frac{-4 \pm 6}{2}$$

$x_1 = 1$
 $x_2 = -5$

$$x^3 - x = 0$$

$$x(x^2 - 1) = 0$$

$$x = 0$$

$$x^2 - 1 = 0$$

$$x = \pm 1$$

	$x = -6$	$x = -5$	$x = -2$	$x = -0.5$	$x = 0.5$	$x = 1$	$x = 2$	$+\infty$
NUMERADOR $x^2 + 4x - 5$	> 0		< 0	< 0	< 0	> 0		
DENOMINADOR $x^3 - x$	< 0	< 0	< 0	> 0	< 0	> 0		
COCIENTE $\frac{x^2 + 4x - 5}{x^3 - x} \geq 0$	< 0	> 0	< 0	> 0	> 0			

$$x \in [-5, -1) \cup (0, 1) \cup (1, +\infty)$$

$$0) \frac{2x+3}{x^3+1} \geq 0$$

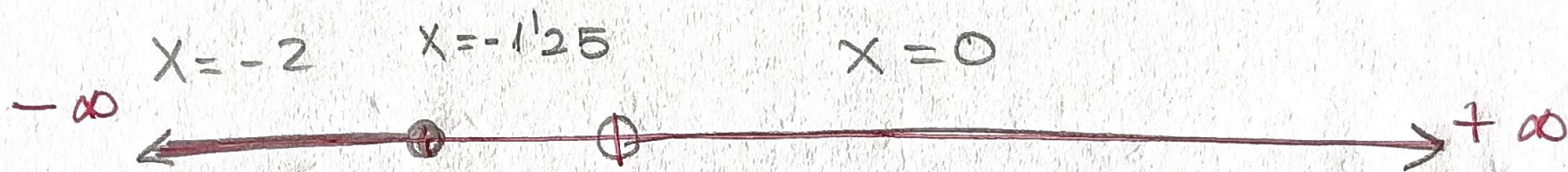
$$2x+3=0$$

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

$$x^3+1=0$$

$$x^3 = -1$$

$$x = -1$$



NUMERADOR

$$2x+3$$

$$< 0$$

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

$$> 0$$

$$> 0$$

DENOMINADOR

$$x^3+1$$

$$< 0$$

$$< 0$$

$$> 0$$

COCIENTE

$$\frac{2x+3}{x^3+1} \geq 0$$

$$> 0$$

$$< 0$$

$$> 0$$

$$x \in (-\infty, -\frac{3}{2}] \cup (-1, +\infty)$$