

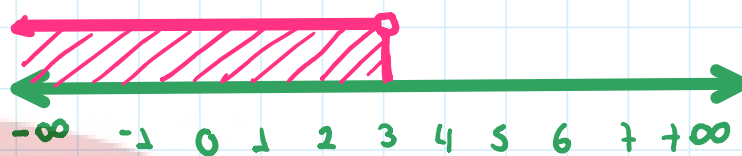
PRACTICA 1 CALCULO I ING.VILDOZO

1) $4x - 5 < 7$

$$4x < 7 + 5$$

$$4x < 12 \quad // (\frac{1}{4})$$

$$x < 3$$



$$C_s:]-\infty, 3[$$

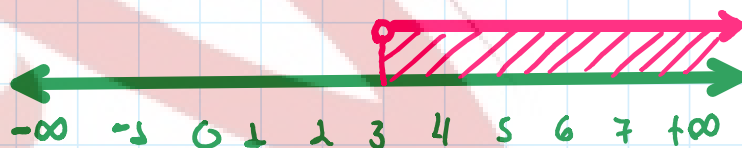
$$C_s: \forall x \in \mathbb{R} / x < 3$$

2) $5 - x < 2$

$$-x < 2 - 5$$

$$-x < -3 \quad // (-1)$$

$$x > 3$$



$$C_s:]3, +\infty[$$

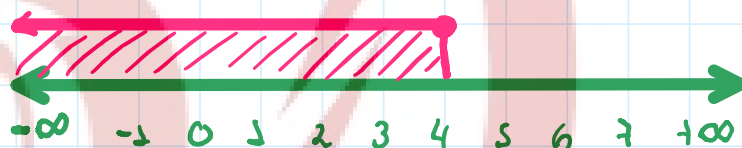
$$C_s: \forall x \in \mathbb{R} / x > 3$$

3) $5x - 4 \leq 3x + 4$

$$5x - 3x \leq 4 + 4$$

$$2x \leq 8$$

$$x \leq 4$$



$$C_s:]-\infty, 4]$$

$$C_s: \forall x \in \mathbb{R} / x \leq 4$$

4) $1 < 2x - 9 < 5$

$$1 + 9 < 2x - 9 + 9 < 5 + 9$$

$$10 < 2x < 14 \quad // (\frac{1}{2})$$

$$5 < x < 7$$



$$C_s:]5, 7[$$

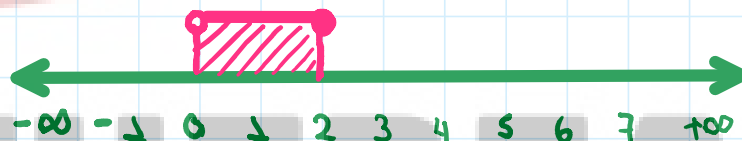
$$C_s: \forall x \in \mathbb{R} / x > 5 \wedge x < 7$$

5) $8 < 5x + 8 \leq 18$

$$8 - 8 < 5x + 8 - 8 \leq 18 - 8$$

$$0 < 5x \leq 10 \quad // (\frac{1}{5})$$

$$0 < x \leq 2$$



$$C_s:]0, 2]$$

$$C_s: \forall x \in \mathbb{R} / x > 0 \wedge x \leq 2$$

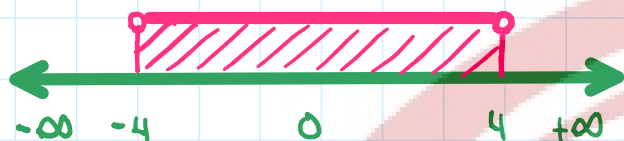
6) Resolver las siguientes inecuaciones por el método del análisis de posibilidades

$$7) x^2 - 16 < 0$$

$$(x-4)(x+4) < 0$$

$$i) x-4 < 0 \wedge x+4 > 0$$

$$x < 4 \wedge x > -4$$



$$C_S:]-4, 4[$$

$$C_S: \forall x \in \mathbb{R} / x > -4 \wedge x < 4$$

$$ii) x-4 > 0 \wedge x+4 < 0$$

$$x > -4 \wedge x < -4$$



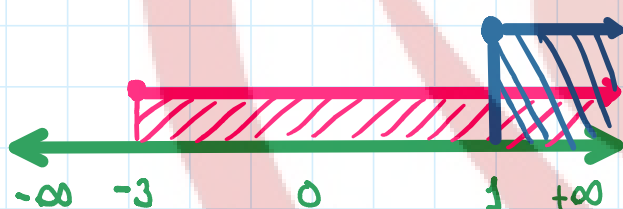
$$C_S: \emptyset$$

$$8) x^2 + 2x - 3 \geq 0$$

$$(x+3)(x-1) \geq 0$$

$$i) x+3 \geq 0 \wedge x-1 \geq 0$$

$$x \geq -3 \wedge x \geq 1$$

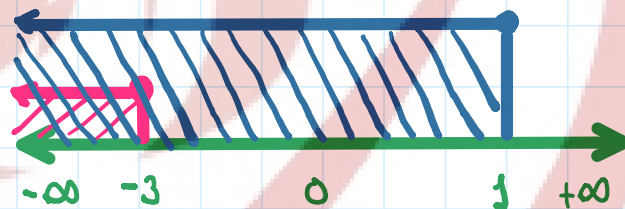


$$C_S: [1, +\infty[$$

$$C_S: \forall x \in \mathbb{R} / x \geq -3 \wedge x \geq 1$$

$$ii) x+3 \leq 0 \wedge x-1 \leq 1$$

$$x \leq -3 \wedge x \leq 1$$



$$C_S:]-\infty, 3]$$

$$C_S: \forall x \in \mathbb{R} / x \leq -3 \wedge x \leq 1$$

Unión :



$$C_S :]-\infty, -3] \cup [1, +\infty[$$

$$C_S: \forall x \in \mathbb{R} / x \leq -3 \wedge x \geq 1$$

9) $x^4 - x^2 < 0$

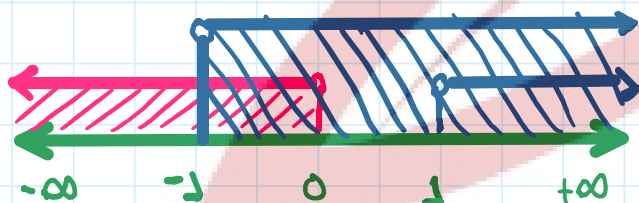
$x^2(x^2 - 1) < 0$

i) $x^2 < 0 \wedge x^2 - 1 > 0$

$x < 0 \wedge x^2 > 1$

$\sqrt{x^2} > \sqrt{1}$
 $x > \pm 1$

$x > 1 \wedge x < -1$



$C_{si} =]-1, 0[$

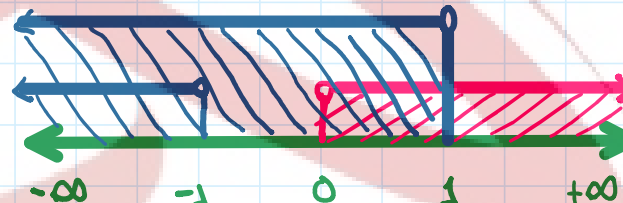
$C_{si} = \forall x \in \mathbb{R} / x > -1 \wedge x < 0$

ii) $x^2 > 0 \wedge x^2 - 1 < 0$

$x > 0 \wedge x^2 < 1$

$\sqrt{x^2} < \sqrt{1}$
 $x < \pm 1$

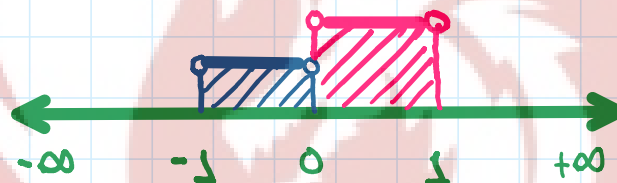
$x < 1 \wedge x > -1$



$C_{sii} =]0, 1[$

$C_{sii} = \forall x \in \mathbb{R} / x > 0 \wedge x < 1$

Unión :



$C_s :]-1, 0[\cup]0, 1[$

$C_s : \forall x \in \mathbb{R} / -1 < x < 0 \wedge 0 < x < 1$

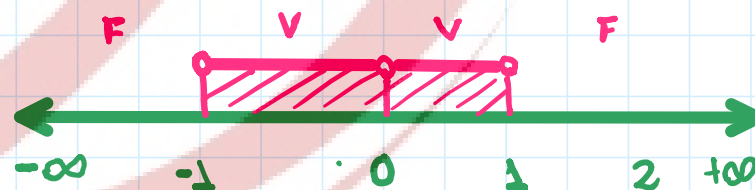
10) $x^4 - x^2 < 0$

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

$x^2(x - 1)(x + 1) < 0$

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

$x = 0 ; x = 1 ; x = -1$



$C_s :]-1, 0[\cup]0, 1[$

$C_s : \forall x \in \mathbb{R} / -1 < x < 0 \wedge 0 < x < 1$

Para $x = 2$

$(2)^4 - (2)^2 < 0$

$16 - 4 < 0$

$12 < 0$ (F)

Para $x = 1/2$

$(1/2)^4 - (1/2)^2 < 0$

$1/16 - 1/4 < 0$

$-3/16 < 0$ (V)

$$11) x^4 - 1 < 0$$

$$(x^2 - 1)(x^2 + 1) < 0$$

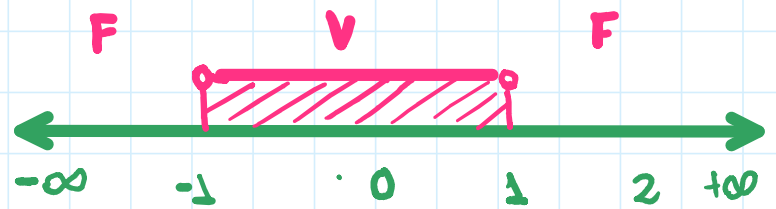
$$(x - 1)(x + 1)(x^2 + 1) < 0$$

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

$$x = 1; x = -1; x^2 = -1$$

$$x = 1; x = -1; x = \sqrt{-1}$$

$$x = 1; x = -1; \emptyset$$



$$Cs:]-1, 1[$$

$$Cs: \forall x \in \mathbb{R} / x > -1 \wedge x < 1$$

Para $x = 2$

$$(2)^4 - 1 < 0$$

$$16 - 1 < 0$$

$$15 < 0 \text{ (F)}$$

Para $x = -2$

$$(-2)^4 - 1 < 0$$

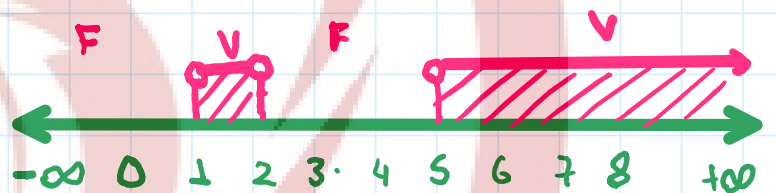
$$16 - 1 < 0$$

$$15 < 0 \text{ (F)}$$

$$12) x^3 - 8x^2 + 17x - 10 > 0$$

M. Ruffini

	1	-8	17	-10
1		1	-7	10
	1	-7	10	$\emptyset$
2		2	-10	
	1	-5	$\emptyset$	
5		5		
	1	$\emptyset$		



$$Cs:]1, 2[\cup]5, +\infty[$$

$$Cs: \forall x \in \mathbb{R} / 1 < x < 2 \wedge x > 5$$

$$* (x - 1)(x - 2)(x - 5) > 0$$

$$x - 1 = 0; x - 2 = 0; x - 5 = 0$$

$$x = 1; x = 2; x = 5$$

Para $x = 3$

$$(3 - 1)(3 - 2)(3 - 5) > 0$$

$$(2)(1)(-2) > 0 \text{ (F)}$$

Para $x = 6$

$$(6 - 1)(6 - 2)(6 - 5) > 0$$

$$(5)(4)(1) > 0 \text{ (V)}$$

$$13) x^3 - 6x^2 + 12x - 8 < 0$$

M. Ruffini

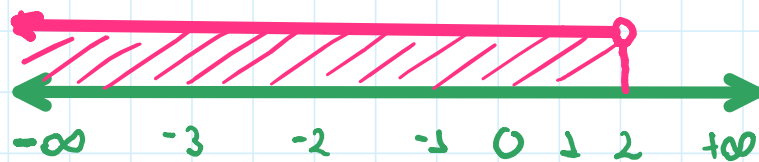
	1	-6	12	-8
2		2	-8	8
	1	-4	4	0
2		2	-4	
	1	-2	0	
2		2		
	1	0		

$$(x-2)(x-2)(x-2) < 0$$

$$(x-2)^3 < 0$$

$$x-2 < 0$$

$$x < 2$$



$$Cs:]-\infty, 2[$$

$$Cs: \forall x \in \mathbb{R} / x < 2$$

$$14) \frac{3}{x} > 1$$

$$\frac{3}{x} - 1 > 0$$

$$\frac{3-x}{x} > 0$$

Denominador

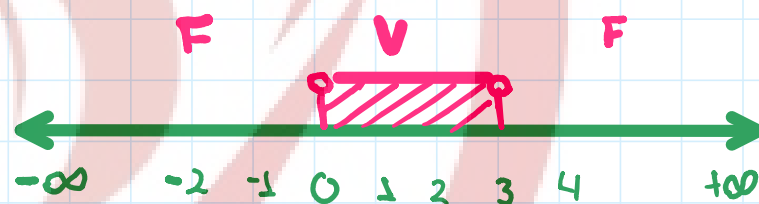
$$x = 0$$

Numerador

$$3-x=0$$

$$-x = -3 // (-1)$$

$$x = 3$$



$$Cs:]0, 3[$$

$$Cs: \forall x \in \mathbb{R} / x > 0 \wedge x < 3$$

Para $x = 2$

$$\frac{3-2}{2} > 0$$

$$\frac{1}{2} > 0 \quad (V)$$

$$15) \frac{5}{x-2} < 0 \Rightarrow \text{Si } x \neq 2$$

Denominador

$$x-2=0$$

$$x=2$$

Para $x = -1$

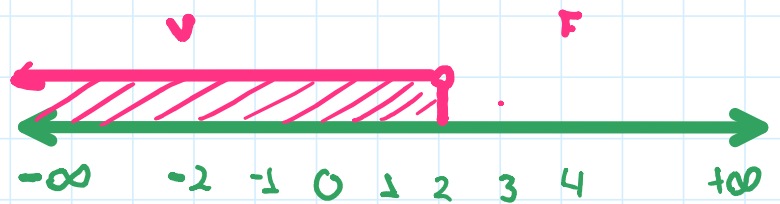
$$\frac{5}{-1-2} < 0$$

$$-\frac{5}{3} < 0 \text{ (V)}$$

Para $x = 3$

$$\frac{5}{3-2} < 0$$

$$\frac{5}{1} < 0 \text{ (F)}$$



$$Cs:]-\infty, 2[$$

$$Cs: \forall x \in \mathbb{R} / x < 2$$

$$16) \frac{x-2}{x-4} < 0 \Rightarrow \text{Si } x \neq 4$$

Denominador

$$x-4=0$$

$$x=4$$

Numerador

$$x-2=0$$

$$x=2$$

Para $x = 1$

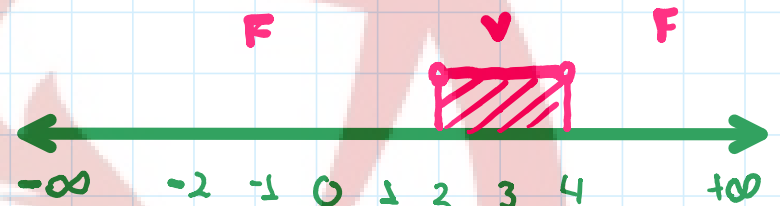
$$\frac{1-2}{1-4} < 0$$

$$\frac{1}{3} < 0 \text{ (F)}$$

Para $x = 3$

$$\frac{3-2}{3-4} < 0$$

$$-1 < 0 \text{ (V)}$$



$$Cs:]2, 4[$$

$$Cs: \forall x \in \mathbb{R} / x > 2 \wedge x < 4$$

$$17) \frac{3x-5}{x-3} > 2$$

$$\frac{3x-5}{x-3} - 2 > 0$$

$$\frac{3x-5-2x+6}{x-3} > 0$$

$$\frac{x+1}{x-3} > 0 \Rightarrow \text{Si } x \neq 3$$

Denominador

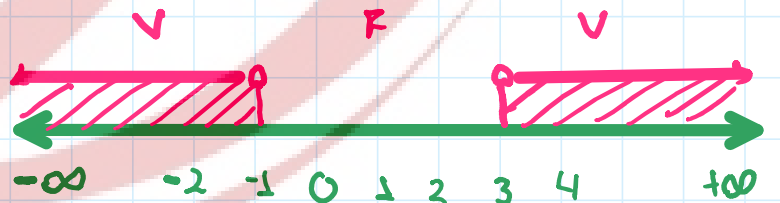
$$x-3=0$$

$$x=3$$

Numerador

$$x+1=0$$

$$x=-1$$



$$Cs:]-\infty, -1[\cup]3, +\infty[$$

$$Cs: \forall x \in \mathbb{R} / x > 3 \wedge x < -1$$

Para $x = 1$

$$\frac{1+1}{1-3} > 0$$

$$\frac{2}{-2} > 0 \text{ (F)}$$

Para $x = -2$

$$\frac{-2+1}{-2-3} > 0$$

$$\frac{1}{5} > 0 \text{ (V)}$$

$$18) \frac{3x-1}{x-4} < 2$$

$$\frac{3x-1}{x-4} - 2 < 0$$

$$\frac{3x-1-2x+8}{x-4} < 0$$

$$\frac{x+7}{x-4} < 0 \Rightarrow \text{Si } x \neq 4$$

Denominador

$$x-4=0$$

$$x=4$$

Numerador

$$x+7=0$$

$$x=-7$$

Para $x = 2$

$$\frac{2+7}{2-4} < 0$$

$$\frac{9}{-2} < 0 \text{ (V)}$$

$$19) \frac{x^2-6x+8}{x^2-4x+3} > 0$$

$$\frac{(x-4)(x-2)}{(x-1)(x-3)} > 0 \Rightarrow \text{Si } x \neq 1 \wedge x \neq 3$$

Denominador

$$(x-1)(x-3)=0$$

$$x-1=0; x-3=0$$

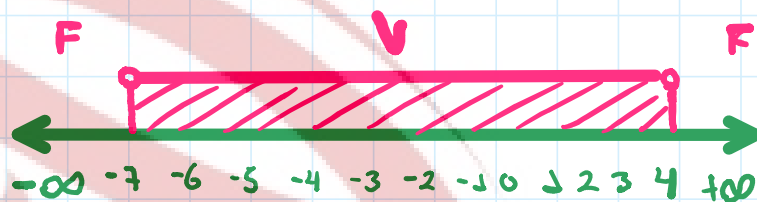
$$x=1; x=3$$

Numerador

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

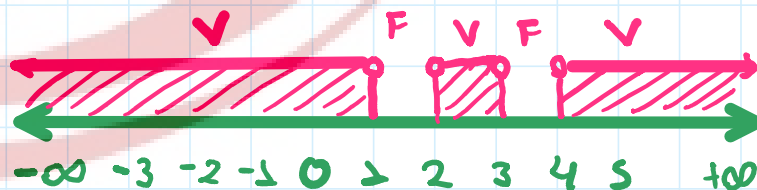
$$x-4=0; x-2=0$$

$$x=4; x=2$$



$$Cs:]-7, 4[$$

$$Cs: \forall x \in \mathbb{R} / x > -7 \wedge x < 4$$



$$Cs:]-7, 4[$$

$$Cs: \forall x \in \mathbb{R} / x > -7 \wedge x < 4$$

Para $x = -2$

$$\frac{(-2-4)(-2-2)}{(-2-1)(-2-3)} > 0$$

$$\frac{(-6)(-4)}{(-3)(-5)}$$

Para $x = 5$

$$\frac{(5-4)(5-2)}{(5-1)(5-3)} > 0$$

$$\frac{(1)(3)}{(4)(2)} > 0$$

20) $\frac{12x}{x+3} > x+3$

$$\frac{3}{8} > 0 \text{ (V)}$$

$$\frac{12x}{x+3} - x - 3 > 0$$

$$\frac{12x - x^2 - 3x - 9}{x+3} > 0$$

$$\frac{6x - x^2 - 9}{x+3} > 0 \quad //(-1)$$

$$\frac{x^2 - 6x + 9}{x+3} < 0$$

$$\frac{(x-3)^2}{x+3} < 0 \Rightarrow \text{Si } x \neq -3$$

Denominador

$$x+3 = 0$$

$$x = -3$$

Numerador

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

$$x-3 = 0$$

$$x = 3$$

Para $x = 1$

$$\frac{(1-3)^2}{1+3} < 0$$

$$1 < 0 \text{ (F)}$$

Para $x = 4$

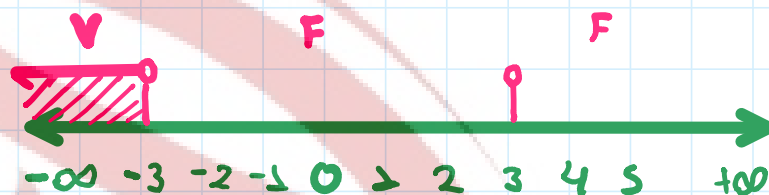
$$\frac{(4-3)^2}{4+3} < 0$$

$$\frac{1}{7} < 0 \text{ (F)}$$

Para $x = -4$

$$\frac{(-4-3)^2}{-4+3} < 0$$

$$-49 < 0 \text{ (V)}$$



$$Cs:]-\infty, -3[$$

$$Cs: \forall x \in \mathbb{R} / x < -3$$

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