

# Lista Cálculo

11

1) a)  $(p+q)^2 = p^2 + q^2$

$$(p+q) \cdot (p+q) = p \cdot p + p \cdot q + p \cdot q + q \cdot q$$

$$(p+q) = p^2 + 2pq + q^2 \neq p^2 + q^2$$

∴ Falso

b)  $(a+b) \cdot (c+d) = ac + bd$

$$(a+b) \cdot (c+d) = a \cdot c + a \cdot d + b \cdot c + b \cdot d$$

$$(a+b) \cdot (c+d) = ac + ad + bc + bd \neq ac + bd$$

∴ Falso

c)  $\sqrt{ab} = \sqrt{a}\sqrt{b}$

$$\sqrt{4 \cdot 9} = \sqrt{4} \cdot \sqrt{9} \Rightarrow \sqrt{36} = +2 \cdot +3 \Rightarrow \pm 6 = \pm 6$$

∴ Verdadeira apenas para  $a \geq 0$  e  $b \geq 0$

d)  $\sqrt{a^2} = a$

$$\sqrt{a^2} = \sqrt{a \cdot a} \text{ ou } \sqrt{(-a) \cdot (-a)} \Rightarrow \sqrt{a^2} = \pm a$$

∴ Falso

e)  $(\sqrt{a})^2 = a$

$$(\sqrt{a}) \cdot (\sqrt{a}) \text{ ou } (-\sqrt{a}) \cdot (-\sqrt{a}) = a$$

∴ Verdadeiro

f)  $\sqrt{a^2 + b^2} = a + b$

$$\sqrt{2^2 + 2^2} = 2 + 2$$

$$\sqrt{8} = 4 \Rightarrow \text{Falso}$$

g)  $(ab)^c = a^c b^c$

Assumindo  $c=2$

$$(ab) \cdot (ab) = a^2 b^2$$

∴ Falso

h)  $\frac{a}{\sqrt{b}} = \frac{a}{b} \Rightarrow a \cdot \frac{b}{\sqrt{b}} = ab \Rightarrow ab \neq \frac{a}{b}$

i)  $(a^3)^2 = a^7 \Rightarrow a^{3 \cdot 2} = a^6$

∴ Falso

j)  $-a^2 = a^2 \Rightarrow -a \cdot a = a^2 \Rightarrow -a^2 + a^2$

∴ Falso

11

k)  $ab + ac = a \cdot b + c$

$$a(b+c) \neq ab + c \Rightarrow \text{Falso}$$

l)  $\left(\frac{a}{b}\right)^{-1} = ab \Rightarrow \frac{a^{-1}}{b^{-1}} = \frac{b}{a} \neq ab$

False.

m)  $\frac{s+tc}{c} = s+t$

$$\frac{s+t\cancel{c}}{\cancel{c}} = \frac{s+t}{c} \neq s+t$$

∴ Falso

n)  $\cancel{x^2y} + \cancel{xz} = xy + xz$

$$\cancel{x^2y} + \cancel{xz} = xy + z \neq xy + xz$$

∴ Falso

o)  $\frac{c/x}{a/x} = \frac{c}{a-b}$

$$\frac{c}{x} \cdot \frac{x}{a-b} = \frac{c}{a-b} \Rightarrow \text{Verdadero}$$

p)  $\frac{1}{x-y} = \frac{1}{x} - \frac{1}{y}$

Assumir  $x=2$  e  $y=1$

$$\frac{1}{2-1} = \frac{1}{2} - \frac{1}{1} \Rightarrow 1 \neq -\frac{1}{2}$$

∴ Falso

$$2) \text{a)} 3(x+6) + 4(2x-5) = 3x + 18 + 8x - 20 = 11x - 2$$
$$\text{b)} (\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b}) = \sqrt{a} \cdot \sqrt{a} - \sqrt{a} \sqrt{b} + \sqrt{a} \sqrt{b} + \sqrt{b} \sqrt{b}$$
$$= \pm a \pm b$$

$$\text{c)} (x+3) \cdot (4x-5) = 4x^2 - 5x + 12x - 15 = 4x^2 + 7x - 15$$
$$\text{d)} (2x+3)^2 = 4x^2 + 6x + 6x + 9 = 4x^2 + 12x + 9$$
$$\text{e)} (x+\sqrt{3})^2 = x^2 + \sqrt{3}x + \sqrt{3}x + 3 = x^2 + 2\sqrt{3}x + 3$$
$$\text{f)} (x-2)^2 = x^2 - 2x - 2x + 4 = x^2 - 4x + 4$$
$$\text{g)} (3-2x)^2 \cdot (2-3x) = (9-12x+4x^2) \cdot (2-3x)$$
$$= (18-24x+8x^2 - 17x + 36x^2 - 12x^3)$$
$$= -12x^3 + 44x^2 - 51x + 18$$
$$\text{h)} (x+2y-5)^2 = (x+2y-5) \cdot (x+2y-5)$$
$$= x^2 + 2xy - 5x + 2xy + 4y^2 - 10y - 5x - 10y + 25$$
$$= x^2 + 4y^2 + 25 + 4xy - 10x - 20y$$

$$3) \text{a)} 9x^2 - 36 = (3x+6) \cdot (3x-6) = 3(x+2) \cdot (x-2)$$
$$\text{b)} x^4 + 27x = x(x^3 + 27) = x(x^3 + 3^3)$$
$$x(x^3 + 3^3) = x(x+3) \cdot (x^2 - 3x + 9)$$
$$\text{c)} x^3 - 3x^2 - 4x + 12 = x^2(x-3) - 4(x-3)$$
$$= (x-2) \cdot (x+2) \cdot (x-3)$$
$$\text{d)} 3x^2 - 18x + 27 = 3(x^2 - 6x + 9) = 3(x-3)^2$$
$$\text{e)} 2x^2 + 5x - 12 = (2x-3)(x+4)$$
$$\text{f)} 3x^{\frac{3}{2}} - 9x^{\frac{1}{2}} + 6x^{\frac{1}{2}} \Rightarrow 3\sqrt{x^3} - 9\sqrt{x} + 6\sqrt{x}$$
$$\Rightarrow 3x^2 - 9x + 6 \Rightarrow 3(x^2 - 3x + 2) \Rightarrow 1-2 \Rightarrow 3(x-2) \cdot (x-1)$$
$$\text{g)} 3x^2 - 7xy - 6y^2 \Rightarrow \underset{3}{x} \underset{-3}{-} \underset{2}{y} \Rightarrow (x-3y) \cdot (3x+2y)$$
$$\text{h)} x^3y - 4xy \Rightarrow xy(x^2 - 4) \Rightarrow xy \cdot (x-2) \cdot (x+2)$$
$$\text{i)} x^3 - 3x + 2 \Rightarrow x^3 - 4x + x + 2 \Rightarrow x \cdot (x^2 - 4) + x + 2$$
$$\Rightarrow x \cdot (x-2) \cdot (x+2) + (x+2) \Rightarrow (x+2) \cdot (x \cdot (x-2) + 1) \Rightarrow$$
$$\Rightarrow (x+2) \cdot \underbrace{(x^2 - 2x + 1)}_{TQP} \Rightarrow (x+2) \cdot (x-1)^2$$

$$1) x^2 + y^2 + z^2 - 2xy + 2xz - 2yz \Rightarrow (x-y+z)^2$$

$$4) a) x+y+z = 16$$

$$\frac{2}{x} + \frac{2}{y} + \frac{2}{z} \mid \frac{x}{yz} + \frac{y}{xz} + \frac{z}{xy} = \frac{4}{5} \Rightarrow$$

$$2yz + 2xz + 2xy + x^2 + y^2 + z^2 = \frac{4}{5} \Rightarrow$$

$$\frac{(x+y+z)^2}{xyz} = \frac{4}{5} \Rightarrow \frac{16^2}{xyz} = \frac{4}{5} \Rightarrow \frac{256}{xyz} = \frac{4}{5}$$

$$\Rightarrow 4xyz = 1280 \Rightarrow xyz = 320$$

$$\therefore xyz = 320.$$

$$b) \frac{4^n - 1}{2^n - 1} = 33 \Rightarrow \frac{2^{2n} - 1}{2^n - 1} = 33$$

$$\Rightarrow \frac{(2^n+1)(2^n-1)}{2^n-1} = 33 \Rightarrow 2^n = 32 \quad n = 5$$

$$6) a) a(bx-c) \geq bc \Rightarrow bx-c \geq \frac{bc}{a} \Rightarrow$$

$$bx \geq \frac{bc}{a} + c \Rightarrow x \geq \frac{bc}{ab} + \frac{c}{b} \Rightarrow x \geq \frac{c}{a} + \frac{c}{b}$$

$$b) ax+b < c \Rightarrow ax < c-b \Rightarrow x < \frac{c-b}{a}$$

$$c) a \leq bx+c < 2a \quad \begin{cases} a \leq bx+c \\ bx+c < 2a \end{cases}$$

$$\Rightarrow \frac{a-c}{b} \leq x < \frac{2a+c}{b}$$

$$d) \frac{ax+b}{c} \leq b \Rightarrow ax+b \leq bc \Rightarrow ax \leq bc-b$$

$$\Rightarrow x \leq \frac{b(c-a)}{a}$$

5) a)  $f(x) = x^4 + 5x^3 - 20x^2 + 4$   $\circ g(x) = x + 3$

$$\begin{array}{r} \cancel{x^4 + 5x^3 - 20x^2 + 4} \\ - \cancel{x^4 + x^3} \end{array} \left| \begin{array}{l} x+1 \\ x^3 + 4x^2 - 24 \end{array} \right.$$

$$\begin{array}{r} \cancel{4x^3 - 20x^2 + 4} \\ - \cancel{4x^3 + 4x^2} \end{array}$$

$$\begin{array}{r} - 24x^2 + 4 \\ - 24x^2 - 24 \end{array}$$

$$\boxed{+24}$$

$$Q = x^3 + 4x^2 - 24$$

$$Q = 28$$

b)  $x^5 + 5x^4 - x^3 - 8x$   $\left| \begin{array}{l} x-3 \\ x^5 - 3x^4 \end{array} \right.$

$$\begin{array}{r} \cancel{8x^4 - x^3 - 8x} \\ - \cancel{8x^4 - 24x^3} \end{array}$$

$$23x^3 - 8x$$

$$Q = x^4 + 8x^3$$

$$R = 23x^3 - 8x$$

c)  $x^6 + 3x^4 + x^2$   $\left| \begin{array}{l} x - \sqrt{5} \\ x^6 - x^5\sqrt{5} \end{array} \right.$

$$\begin{array}{r} \cancel{-x^5\sqrt{5} + 3x^4 + x^2} \\ - \cancel{x^5\sqrt{5} + 5x^4} \end{array}$$

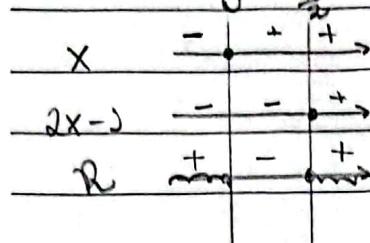
$$\begin{array}{r} - 8x^4 + x^2 \\ - 2x^4 - 2x^3\sqrt{5} \end{array}$$

$$\begin{array}{r} 2x^3\sqrt{5} + x^2 \\ - 8x^3\sqrt{5} - 10x^2 \end{array}$$

$$\begin{array}{r} - 11x^2 + 0 \\ - 11x\sqrt{5} \end{array}$$

$$\begin{array}{r} - 11x\sqrt{5} + 55 \\ 55 \end{array}$$

$$\exists) \text{ a) } x(2x-1) \geq 0 \quad \begin{cases} x=0 \\ 2x-1=0 \Rightarrow x=\frac{1}{2} \end{cases}$$



$$S = \{x \in \mathbb{R} \mid x > \frac{1}{2} \text{ ou } x \leq 0\}$$

$$\text{ou } S = ]-\infty, 0] \cup [\frac{1}{2}, +\infty[$$

$$\text{b) } (2x-1) \leq 0 \quad \begin{cases} 2x-1=0 \Rightarrow x=\frac{1}{2} \\ x-3=0 \Rightarrow x=3 \end{cases}$$



$$S = \{x \in \mathbb{R} \mid \frac{1}{2} \leq x < 3\}$$

$$\text{ou } S = [\frac{1}{2}, 3[$$

$$\text{c) } (x-2)(x+2) > 0 \quad \{x=2, x=-2\}$$



$$S = \{x \in \mathbb{R} \mid x > 2 \text{ ou } x < -2\}$$

$$\text{ou } S = ]2, +\infty[ \cup ]-\infty, -2[$$

$$\text{d) } x(2x-1) \geq 0 \quad \{x=0, x=\frac{1}{2}, x=-1\}$$

$$x+1 \Rightarrow x \neq -1$$

$$x = -1 - 0 + \frac{1}{2} + \rightarrow S = \{x \in \mathbb{R} \mid x \geq \frac{1}{2} \text{ ou } -1 < x \leq 0\}$$

$$2x-1 = - - - + \rightarrow \text{ou } S = [\frac{1}{2}, +\infty[ \cup ]-1, 0[$$



$$\text{e) } x(2x-3)(x^2+1) < 0 \quad \{x=0, x=\frac{3}{2}, x=1\}$$



$$2x-3 = - - - + \rightarrow S = \{x \in \mathbb{R} \mid 0 < x < \frac{3}{2}\}$$

$$x^2+1 = + 0 + + \rightarrow \text{ou } S = ]0, \frac{3}{2}[$$



$$f) (x-1)(3x-4)^2 \leq 0 \quad \{ x=1, x=\frac{4}{3} \}$$

$$x-1 \quad - \quad + \quad + \rightarrow$$

$$(3x-4) \quad - \quad - \quad + \rightarrow \quad S = \{x \in \mathbb{R} \mid x \leq 1 \text{ ou } x = \frac{4}{3}\}$$

$$(3x-4) \quad - \quad - \quad + \rightarrow \quad \text{ou } S = ]-\infty, 1] \cup \{\frac{4}{3}\}$$

$$\mathbb{R} \quad - \quad + \quad + \rightarrow$$

$$1 \quad \frac{4}{3}$$

$$8) a) 3-x < 5+3x \Rightarrow -2 < 4x \Rightarrow x > -\frac{1}{2}$$

$$\xrightarrow{-2 < 4x} \mathbb{R}$$

$$b) 2 > -3-3x \geq -7$$

$$2 > -3-3x \Rightarrow 3x > -5 \Rightarrow x > -\frac{5}{3} \quad -\frac{5}{3} \quad \frac{4}{3} \rightarrow \mathbb{R}$$

$$-3-3x \geq -7 \Rightarrow 3x \leq 4 \Rightarrow x \leq \frac{4}{3}$$

$$c) \frac{5}{x} < \frac{7}{4} \quad x \neq 0 \Rightarrow \frac{5-7}{x} < 0 \Rightarrow \frac{20-7x}{4x} < 0$$

$$\Rightarrow x < 0 \quad \text{e} \quad x > \frac{20}{7} \quad \xrightarrow{x < 0, \quad x > \frac{20}{7}}$$

$$d) 1-x-2x^2 \geq 0 \Rightarrow (1-2x)(1+x) \geq 0$$

$$(2x-1) \quad + \quad - \quad + \rightarrow$$

$$(1+x) \quad - \quad + \quad + \rightarrow$$

$$\mathbb{R} \quad - \quad - \quad + \rightarrow$$

$$-1 \quad \frac{1}{2} \rightarrow \mathbb{R}$$

$$e) x^3+1 > x^2+x \Rightarrow x^3-x^2-x+1 > 0 \Rightarrow$$

$$\Rightarrow x^2(-x-1)-(x-1) > 0 \Rightarrow (x-1) \cdot (x^2-1) > 0 \Rightarrow$$

$$x-1 \quad - \quad - \quad + \rightarrow$$

$$x^2-1 \quad + \quad - \quad + \rightarrow$$

$$-1 \quad 1 \rightarrow \mathbb{R}$$

$$\mathbb{R} \quad - \quad + \quad + \rightarrow$$

$$f) 8x^3-4x^2-2x+1 < 0 \Rightarrow 4x^2(2x-1)-2x+1 < 0$$

$$\Rightarrow 4x^2(2x-1)-(2x-1) < 0 \Rightarrow (2x-1) \cdot (4x^2-1) < 0$$

$$2x-1 \quad - \quad - \quad + \rightarrow$$

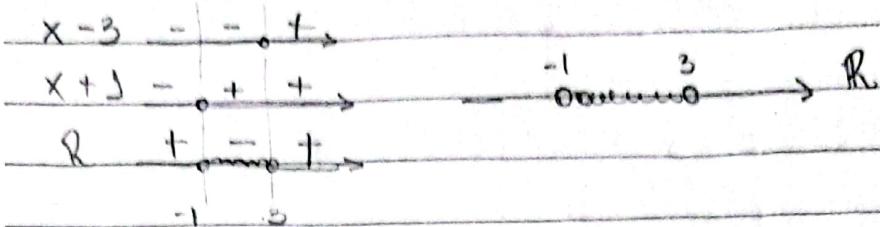
$$4x^2-1 \quad + \quad - \quad + \rightarrow$$

$$\mathbb{R} \quad - \quad + \quad + \rightarrow$$

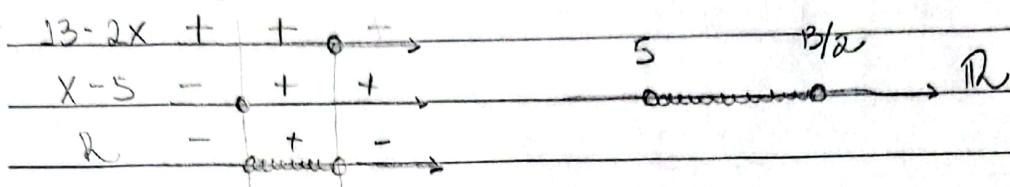
$$-1 \rightarrow$$

$$g) (x-1)^2 < 4 \Rightarrow x^2 - 2x + 1 - 4 < 0 \Rightarrow$$

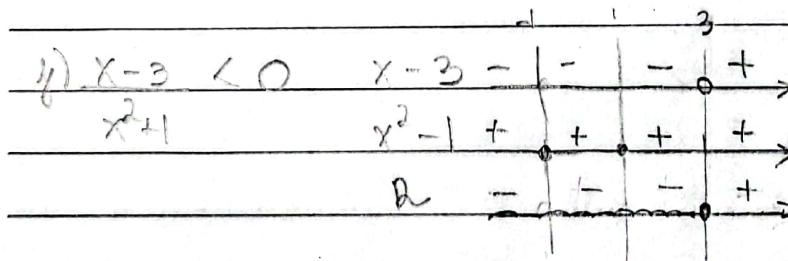
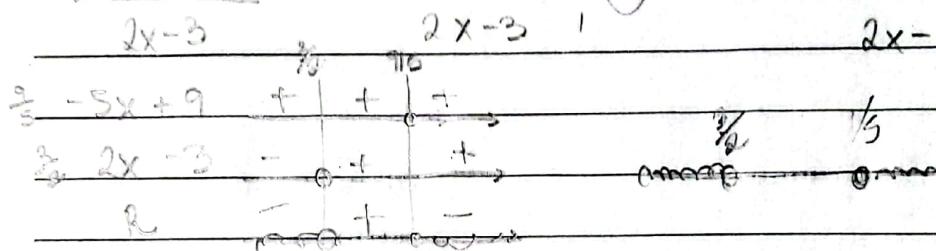
$$x^2 - 2x - 3 < 0 \Rightarrow (x-3) \cdot (x+1) < 0$$



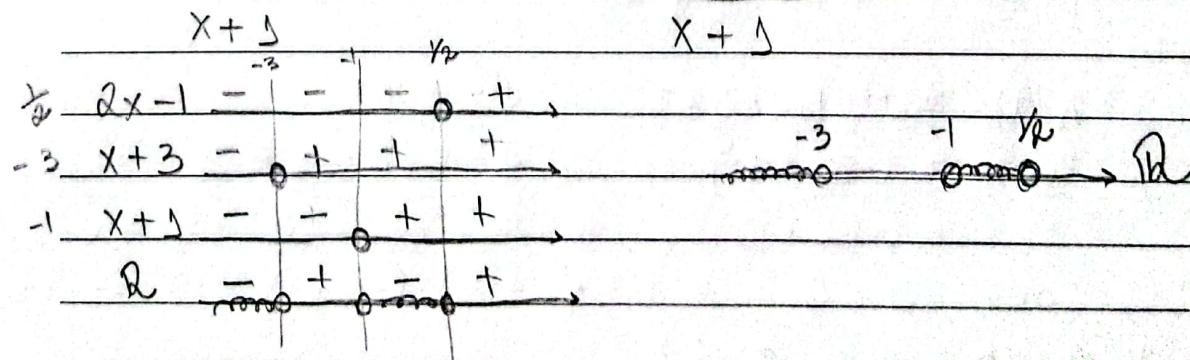
$$h) 3 > 2 \Rightarrow 3 - 2 > 0 \Rightarrow \frac{13-2x}{x-5} > 0$$

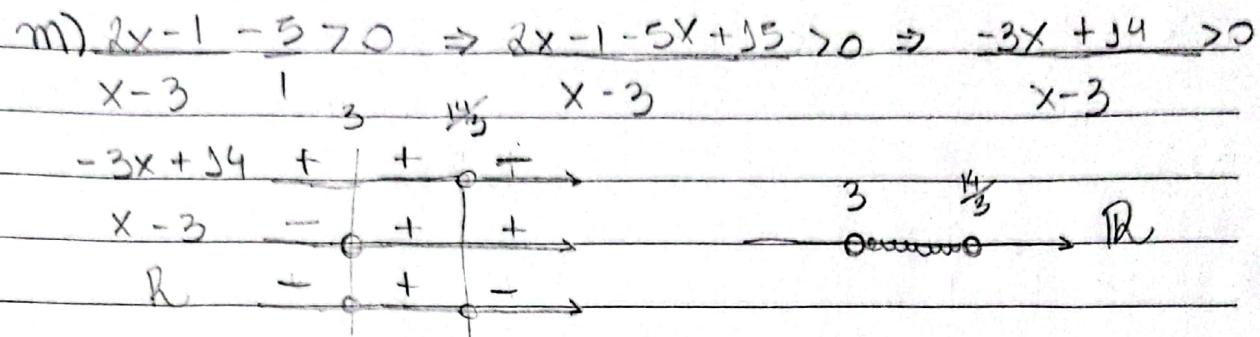
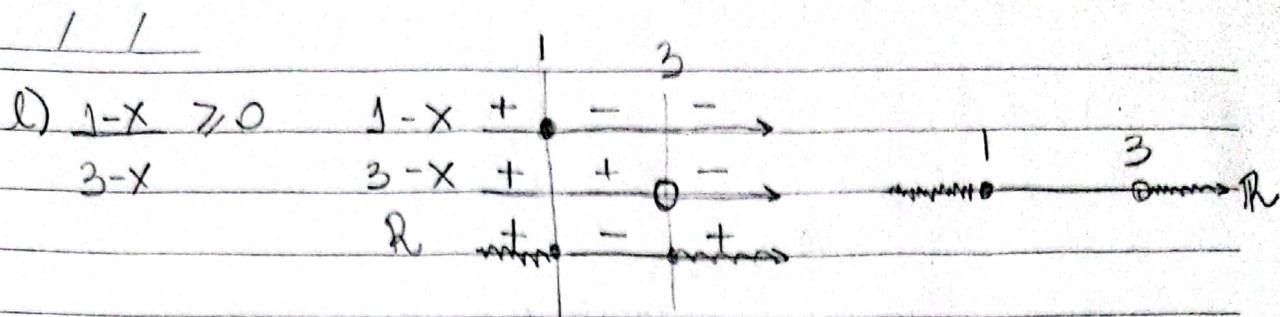


$$i) x \leq 3 \Rightarrow x - 3 \leq 0 \Rightarrow -5x + 9 \leq 0$$



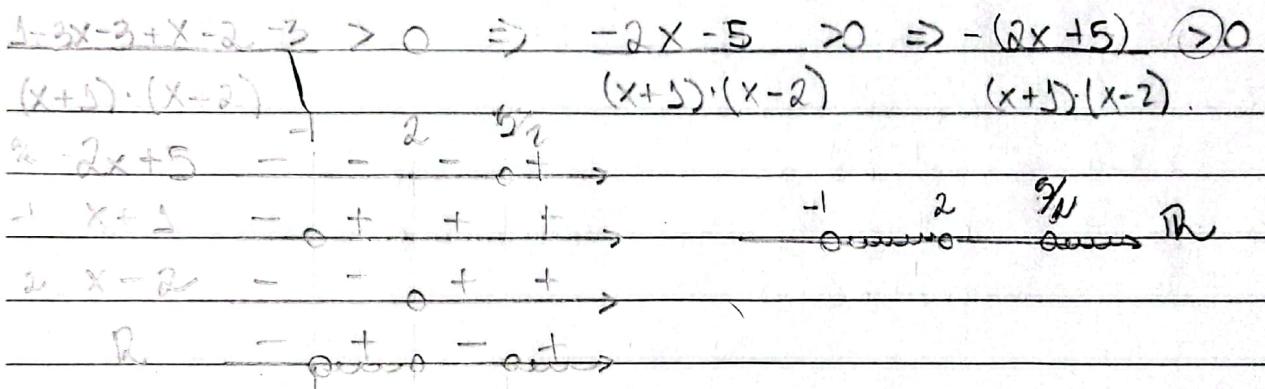
$$k) 2x^2 + 5x - 3 < 0 \Rightarrow (2x-1) \cdot (x+3) < 0$$





n)  $1 \geq 3 \Rightarrow 1 - 3 \geq 0 \Rightarrow$

$$x+5 \quad x-2 \quad x+5 \quad x-2$$



9) a)  $50 \leq F \leq 95$

$$C_1 = \frac{5}{9} (50-32) \Rightarrow C_1 = \frac{1}{9} \cdot \frac{18}{5} \Rightarrow C_1 = 10^\circ C$$

$$C_2 = \frac{5}{9} (90-32) \Rightarrow C_2 = \frac{63.5}{9} \Rightarrow C_2 = 35^\circ C$$

Resposta:  $10^\circ C \leq 35^\circ C$

b)  $a(t) = t(-5t+10)+30$

$$30 = t(-5t+10)+30 \Rightarrow t_1(-5t_1+10) = 0 \Rightarrow t_1 = 2$$

$$15 = t(-5t+10)+30 \Rightarrow t_2(-5t_2+10) + 15 = 0$$

$$\Rightarrow -5t_2^2 + 10t_2 + 15 = 0 \Rightarrow (-5t_2^2 + 15) \cdot (t_2 + 1) = 0 \Rightarrow t_2 = 3$$

Resposta:  $2 \leq t \leq 3$

10) a)  $|5x - 3| = 12$

I)  $5x - 3 \geq 0 \rightarrow \frac{3}{5}$

$$5x = 15$$

$$x = 3$$

II)  $5x - 3 \leq 0 \rightarrow \frac{3}{5}$

$$-(5x - 3) = 12$$

$$-5x + 3 = 12$$

$$x = -\frac{9}{5}$$

b)  $|-4 + 12x| = 7 \rightarrow \frac{4}{12}$

I)  $-4 + 12x = 7$

$$x = \frac{11}{12}$$

II)  $-4 + 12x = -7$

$$x = \frac{3}{12} = \frac{1}{4}$$

c)  $|2x - 3| = |7x - 5| \rightarrow (\sqrt{(2x-3)^2})^2 - (\sqrt{(7x-5)^2})^2 = 0 \rightarrow$   
 $(2x-3)^2 - (7x-5)^2 = 0 \rightarrow [(2x-3) + (7x-5)] \cdot [(2x-3) - (7x-5)] = 0$   
 $(9x-8) \cdot (-5x+2) = 0 \Rightarrow x_1 = \frac{8}{9} \quad x_2 = \frac{2}{5}$

d)  $\left| \frac{x+2}{x-2} \right| = 5 \Rightarrow \left( \frac{\sqrt{(x+2)^2}}{\sqrt{(x-2)^2}} \right)^2 = 5^2 \Rightarrow (x+2) \cdot (x-2) = 25$   
 $(x-2) \cdot (x-2)$

$$\frac{x^2 + 4x + 4 - 25}{x^2 - 4x + 4} = 0 \Rightarrow x^2 + 4x + 4 - 25x^2 + 100x - 100 = 0$$

$$\Rightarrow \frac{-24x^2 + 104x - 96}{(x-2)^2} = 0 \Rightarrow 8(-3x^2 + 13x - 12) = 0$$

$$\Rightarrow 8 \cdot (-3x+4) \cdot (x-3) = 0 \Rightarrow x_1 = \frac{4}{3} \quad x_2 = 3$$

$$(x-2) \cdot (x-2) \quad x \neq 2$$

e)  $|3x + 2| = 5 - x \Rightarrow (\sqrt{(3x+2)^2})^2 = (5-x)^2 \Rightarrow$   
 $(3x+2)^2 - (5-x)^2 = 0 \Rightarrow [(3x+2) + (5-x)][(3x+2) - (5-x)] = 0$   
 $\Rightarrow (2x+7)(4x-3) = 0 \Rightarrow x_1 = -\frac{7}{2}, \quad x_2 = \frac{3}{4}$

f)  $|9x| - 11 = x \Rightarrow (\sqrt{9x^2})^2 = (x+11)^2 \Rightarrow (9x)^2 - (x+11)^2 = 0$   
 $\Rightarrow [(9x) + (x+11)][(9x) - (x+11)] = 0 \Rightarrow (10x+11)(8x-11) = 0$   
 $x_1 = -\frac{11}{10} \quad x_2 = \frac{11}{8}$

11

g)  $|x-3| + |x+1| = 4 \Rightarrow |x-3 + x+1| = 4$   
 $\Rightarrow |2x-2| = 4 \Rightarrow (\sqrt{(2x-2)^2})^2 = 4^2 \Rightarrow$   
 $(2x-2)^2 = 16 \Rightarrow 4x^2 - 8x + 4 - 16 = 0 \Rightarrow$   
 $4x^2 - 8x - 12 = 0 \Rightarrow (4x+4)(x-3) = 0$   
 $x_1 = -1 \quad x_2 = 3 \quad ; \quad -1 \leq x \leq 3$

jj) a)  $|x| < 3 \quad ; \quad -3 < x < 3$

$x_1 < 3$

$x_2 > -3$

b)  $\left| \frac{z-1}{5} \right| < 1 \quad \textcircled{1} \rightarrow \frac{z-1}{5} \leq 1 \Rightarrow z \leq 10$

$\textcircled{2} \rightarrow \frac{z-1}{5} \geq -1 \Rightarrow z \leq 0$

$\therefore 0 \leq z \leq 10$

c)  $|3-x| > 1 \rightarrow \textcircled{1} \rightarrow 3-x > 1 \rightarrow -x > 0 \rightarrow x < 0$

$\textcircled{2} \rightarrow 3-x < -1 \rightarrow -x < -2 \rightarrow x > 2$

$\therefore x < 0 \text{ ou } x > 2$

d)  $|t-1| \leq 3 \rightarrow t-1 \leq 3 \rightarrow t \leq 4$

$t-1 \geq -3 \rightarrow t \geq -2$

$\therefore -2 \leq t \leq 4$

e)  $\left| \frac{3-1}{x} \right| < \frac{1}{2}$  I)  $\frac{3-1}{x} \geq 0 \rightarrow x < 1 \quad <$

$-(-1) \times$

y

p)  $|6+2x| < |4-x| \rightarrow (\sqrt{(6+2x)^2})^* < (\sqrt{(4-x)^2})^* \Rightarrow$   
 $(6+2x)^2 - (4-x)^2 < 0 \rightarrow [(6+2x)+(4-x)][(6+2x)-(4-x)] < 0$

$(10+x)(2+3x) < 0$

10+x	-	0	+
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2+3x	-	0	+
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$S = \{x \in \mathbb{R} \mid -10 < x < -\frac{2}{3}\}$

q)  $|x-1| + |x+2| \geq 4 \rightarrow |x-1+x+2| \geq 4 \rightarrow$   
 $\rightarrow |2x+1| \geq 4 \rightarrow (\sqrt{(2x+1)^2})^* \geq 4^2 \rightarrow 4x^2 + 4x + 1 \geq 16$   
 $4x^2 + 4x - 15 \geq 0 \rightarrow (2x-3)(2x+5) \geq 0$

2x-3	-	-	0	+
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2x+5	-	0	+	+
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R	+	-	0	+
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$S = \{x \in \mathbb{R} \mid x \geq \frac{3}{2} \text{ ou } x \leq -\frac{5}{2}\}$

r)  $|x| + 1 < x \rightarrow |x| < x-1 \rightarrow (\sqrt{x^2})^* < (x-1)^2$   
 $\rightarrow x^2 < x^2 + 2x - 1 \rightarrow -2x - 1 < 0 \rightarrow \emptyset$

i)  $\frac{1}{|x+1||x-3|} \geq \frac{1}{5} \rightarrow |(x+1)(x-3)| \geq \frac{1}{5}$

$|(x+1)(x-3)| \geq 5 \rightarrow x^2 - 2x - 3 \geq 5 \rightarrow x^2 - 2x - 8 \geq 0$

II)  $(x+1)(x-3) = -5 \rightarrow x^2 - 2x - 3 = -5 \rightarrow x^2 - 2x + 2 = 0$   
 $x(x-2)+2 = 0$

-2	x+2	-	+	-	+	+	+
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4	x-4	-	-	-	-	+
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2	x-2	-	-	-	+	+
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0	x	-	-	+	+	+
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I	+	-	+	-	+	+
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$S = \{x \in \mathbb{R} \mid 0 \leq x \leq 2 \text{ ou } x \geq 4 \text{ ou } x \leq -2\}$

$$\begin{aligned}
 & \text{Solve } |3-2x| \leq 4 \quad \rightarrow \quad \left( \frac{|3-2x|}{|1+x|} \right)^2 \leq 4^2 \\
 & \frac{(3-2x)^2}{(1+x)^2} \leq 16 \quad \Rightarrow \quad \frac{4x^2 - 12x + 9 - 16}{x^2 + 2x + 1} \leq 0 \\
 & \frac{4x^2 - 12x - 7}{x^2 + 2x + 1} \leq 0 \quad \rightarrow \quad \frac{-12x^2 - 44x - 7}{(x+1)^2} \leq 0 \\
 & (-2x-7) \cdot (6x+1) \leq 0 \\
 & (x+1) \cdot (x+5) \\
 & S = \left\{ x \in \mathbb{R} \mid x \leq -\frac{7}{2} \text{ or } x \geq -\frac{1}{6} \right\}
 \end{aligned}$$

$$K) \quad j < |x+2| < 4$$

$$1) \quad 1 < |x+2| \rightarrow 1^2 < (x+2)^2 \rightarrow 1 < x^2 + 4x + 4 \rightarrow 0 < x^2 + 4x + 3$$

$$(x+3)(x+1) > 0$$

$$11) |x+2| < 4 \rightarrow (x+2)^2 < 4^2 \rightarrow x^2 + 4x + 4 < 16 \rightarrow$$

$$x^2 + 4x - 12 < 0 \rightarrow (x+6)(x-2) < 0$$

$$1) \begin{array}{c} x+3 \\ x+1 \\ x+0 \\ x-2 \\ R \end{array} - \begin{array}{ccccccc} - & + & + & + & + & + & + \end{array} \rightarrow$$

$$S = \{x \in \mathbb{R} \mid -6 < x \leq -3 \text{ or } -1 < x < 2\}$$