

Conjuntos Numéricos

- Reúne diversos conjuntos cujos elementos são números
- Formados pelos números naturais, inteiros, racionais, irracionais e reais.

Números Naturais (\mathbb{N})

$$\hookrightarrow \mathbb{N} = \{1, 2, 3, 4, 5, 6, \dots\}$$

Números Inteiros (\mathbb{Z}) → Naturais e seus Opostos

$$\hookrightarrow \mathbb{Z} = \{\dots, -2, -1, 0, 1, 2, \dots\}$$

Números Racionais (\mathbb{Q})

$$\hookrightarrow \mathbb{Q} = \{m/n, m \in \mathbb{Z} \text{ e } n \neq 0\}$$

Números Irracionais (\mathbb{I}) → Não exatos

$$\hookrightarrow \mathbb{I} = \{\dots, \pi, \sqrt{2}, \sqrt{3}, \dots\}$$

Números Reais (\mathbb{R})

$$\hookrightarrow \text{Engloba os 4 conjuntos}$$

Equações do 1º Grau

Só letra no 1º membro

$$\rightarrow 3x - 8 (=) 7x + 3 \quad \leftarrow$$

Somente letra no 2º membro

\rightarrow Passou para o outro lado muda o sinal

Inequação do 1º Grau

$$* ax > b \quad * ax < b \quad * ax \geq b \quad * ax \leq b$$

\rightarrow Passo 1 \rightarrow Isolar a incógnita

\rightarrow Passo 2 \rightarrow Se for positivo \rightarrow Isolar e achar a solução

\rightarrow Passo 2 \rightarrow Se for negativo \rightarrow Multiplicar por -1
toda a desigualdade e inverter o sinal

Módulo

$|x|$ representa a distância do número à origem

\rightarrow Se a e b representam números reais, então $|a - b|$ representa a distância entre a e b na reta

\rightarrow É sempre um número positivo

* Equações Modulares $\rightarrow |x| = 3 \rightarrow x = \pm 3$

* Inequações Modulares $\rightarrow |x| \leq 3 \rightarrow -3 \leq x \leq 3$

\rightarrow Se $|x| \geq a$, então $x \leq -a$ ou $x \geq a$

\rightarrow ou seja, se $|3| \leq x$, então $x \leq -3$ ou $x \geq 3$

Lista de Exercícios Semana 1

Matemática C

PARTE 1

① Indique quais são:

a) NATURAIS: 517, 100000000 e $14/2$

b) INTEIROS: $-\sqrt{4}$, 517, -2, 0, 100000000 e $14/2$

c) RACIONAIS:

↳ 5,25 ; $-\sqrt{4}$; 517 ; -2 ; $\frac{632}{75}$; 0 ; 100000000 e $14/2$

d) IRRACIONAIS:

↳ $\sqrt{5}$; $125,\bar{6}$; $0,\bar{3}$ e $\sqrt{2}-1$

$$\textcircled{2} \text{ a) } \frac{1}{5} + \frac{9}{5} = \frac{10}{5} = 2$$

$$\text{b) } \frac{1}{2} + \frac{5}{7} - 1 = \frac{7+10-14}{14} = \frac{3}{14}$$

$$\text{c) } \frac{5}{4} - \frac{4}{5} = \frac{25-16}{20} = \frac{9}{20}$$

$$\text{d) } \frac{3}{2} + \frac{5}{14} + \frac{8}{35} = \frac{105+25+16}{70} = \frac{146}{70} = \frac{73}{35}$$

$$e) \frac{5}{7} \div \frac{7}{3} = \frac{5}{7} \cdot \frac{3}{7} = \frac{15}{49}$$

$$f) \frac{2}{7} \cdot \frac{5}{7} = \frac{10}{49}$$

$$g) \frac{2}{5} \cdot \frac{25}{9} \cdot \frac{7}{4} = \frac{350}{180} = \frac{175}{90} = \frac{35}{18}$$

$$h) \frac{13}{2} \cdot \frac{21}{5} - \frac{5}{24} \cdot \frac{15}{2} = \frac{273}{10} - \frac{10}{360} \rightarrow \frac{9828}{360} - \frac{10}{360} = \frac{9818}{360} = \frac{4909}{180}$$

$$\textcircled{3} a) \frac{1}{3} \text{ de } 42 \rightarrow 42 \cdot \frac{1}{3} = 14$$

$$b) \frac{1}{8} \text{ de } 92 \rightarrow 92 \cdot \frac{1}{8} = \frac{92}{8} = \frac{46}{4} = \frac{23}{2}$$

$$c) \frac{4}{5} \text{ de } 65 \rightarrow 65 \cdot \frac{4}{5} = \frac{260}{5} = 52$$

$$d) \frac{9}{7} \text{ de } 63 \rightarrow 63 \cdot \frac{9}{7} = \frac{567}{7} = 81$$

$$\textcircled{4} 45 - \frac{3}{8} \rightarrow 45 \cdot \frac{8}{3} = \frac{360}{3} = \boxed{120} \therefore R: \text{ presente custou R\$120,00}$$

$$\textcircled{5} 350 - \frac{5}{6} \rightarrow \frac{2100}{5} = 420 \rightarrow 420 \cdot \frac{4}{7} = \frac{1680}{7} = \boxed{240}$$

$$\textcircled{6} 300 - \frac{3}{5} \rightarrow \frac{1500}{3} = 500 \rightarrow 500 \cdot \frac{1}{5} = \boxed{100,00}$$

$$\textcircled{7} 1 - \frac{1}{9} \Rightarrow \frac{8}{9} - 104 \rightarrow 104 \cdot \frac{9}{8} = \frac{936}{8} = \boxed{117 \text{ estudantes}}$$



$$\textcircled{8} \frac{1}{5} + \frac{3}{4} = \frac{4+15}{20} = \boxed{\frac{19}{20}}$$

$$b) 1 - \frac{19}{20} = \boxed{\frac{1}{20}}$$

$$\textcircled{9} \frac{x}{2} + \frac{x}{3} = 30 \rightarrow \frac{3x+2x}{6} = 30 \rightarrow \frac{5x}{6} = 30 \rightarrow x = 36$$

$$\textcircled{10} a) \frac{1}{3} \cdot \left(\frac{3}{5} + \frac{1}{2} \right) \rightarrow \frac{1}{2} + \frac{3}{5} = \frac{5+6}{10} = \frac{11}{10} \cdot \frac{1}{3} = \boxed{\frac{11}{30}}$$

$$b) \frac{5}{2} \cdot \left(\frac{4}{3} - \frac{3}{4} \right) \rightarrow \frac{4}{3} - \frac{3}{4} = \frac{16-9}{12} = \frac{7}{12} \cdot \frac{5}{2} = \boxed{\frac{35}{24}}$$

$$c) \left(\frac{5}{4} - \frac{1}{2} \right) \cdot \left(\frac{1}{3} + \frac{2}{5} \right) \rightarrow \frac{5}{4} - \frac{1}{2} = \frac{5-2}{4} = \left(\frac{3}{4} \right) \cdot \left(\frac{1}{3} + \frac{2}{5} \right) \rightarrow$$

$$\rightarrow \frac{1}{3} + \frac{2}{5} = \frac{5+6}{15} \rightarrow \left(\frac{11}{15} \right) \cdot \left(\frac{3}{4} \right) = \frac{33}{60} = \boxed{\frac{11}{20}}$$

$$d) \left(\frac{1}{4} + \frac{1}{2} \right) : \left(\frac{3}{2} + 3 \right) \rightarrow \left(\frac{1}{4} + \frac{2}{4} \right) : \left(\frac{3}{2} + \frac{6}{2} \right) = \frac{3}{4} : \frac{9}{2} = \frac{6}{36} = \frac{1}{6}$$

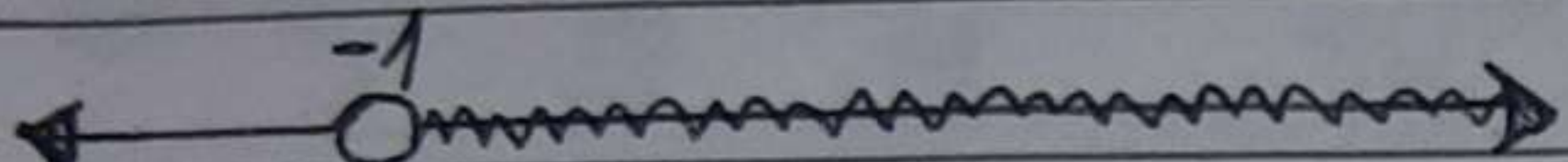
$$e) \left(\frac{1}{2} - \frac{1}{6} \right) : \left(\frac{1}{3} - \frac{1}{4} \right) \rightarrow \left(\frac{3}{6} - \frac{1}{6} \right) : \left(\frac{4}{12} - \frac{3}{12} \right) \rightarrow \frac{2}{6} : \frac{1}{12} = \frac{24}{6} = \boxed{4}$$

$$\textcircled{11} a) 7 \cdot \frac{2}{3} + 16 \cdot \frac{5}{12} \rightarrow \frac{14}{3} + \frac{80}{12} \rightarrow \frac{14}{3} + \frac{20}{3} = \frac{34}{3} = 11, \bar{3}$$

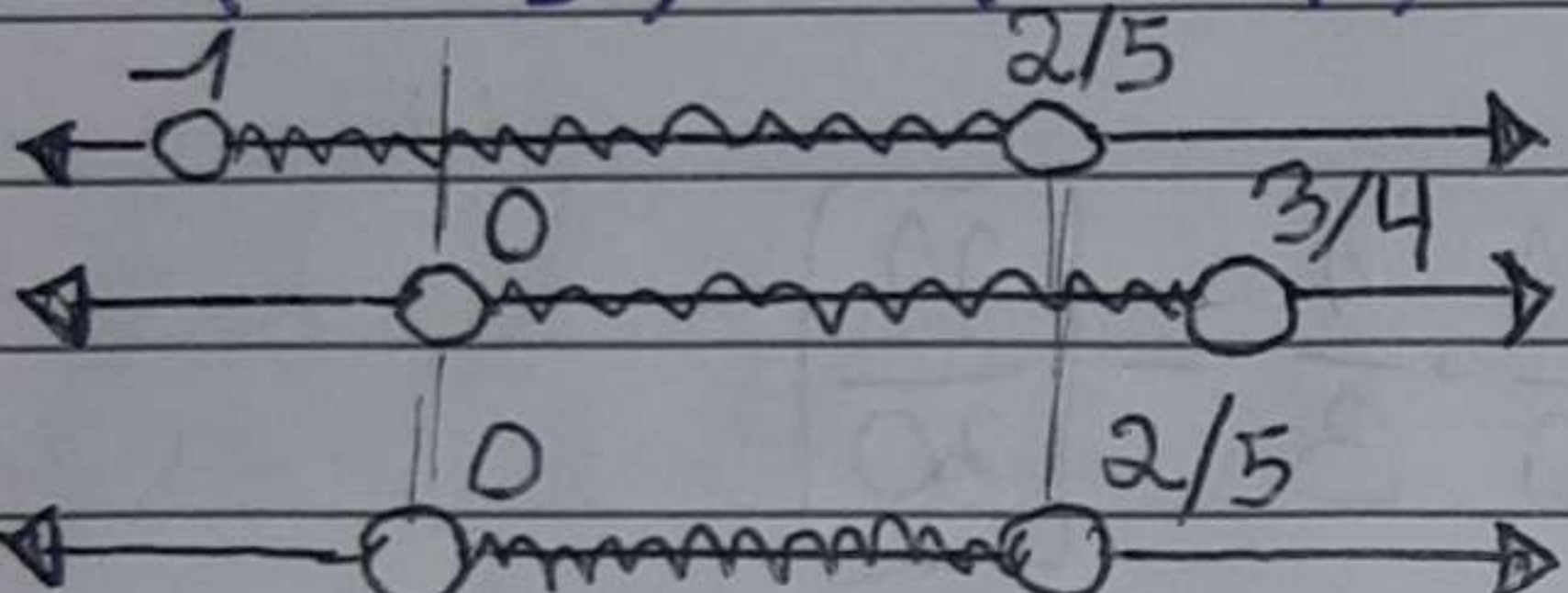
$$b) 5 - \left(2 : \frac{5}{3} \right) \rightarrow 5 - \frac{6}{5} \rightarrow \frac{25}{5} - \frac{6}{5} = \frac{19}{5} = 3,8$$

PARTE 2

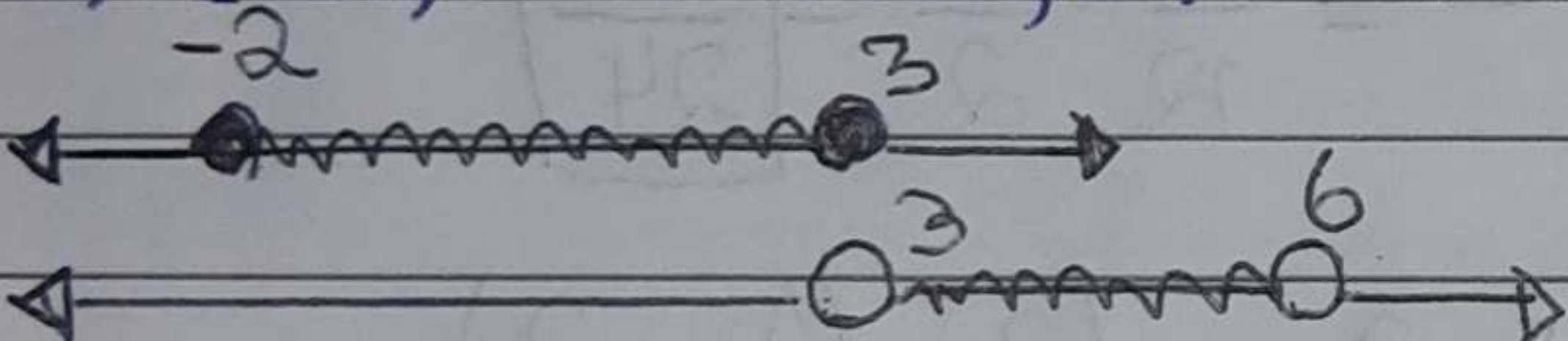
① a) $(-1, 1) \cup [1, +\infty)$

 $S = \{x \in \mathbb{R} / x > -1\}$

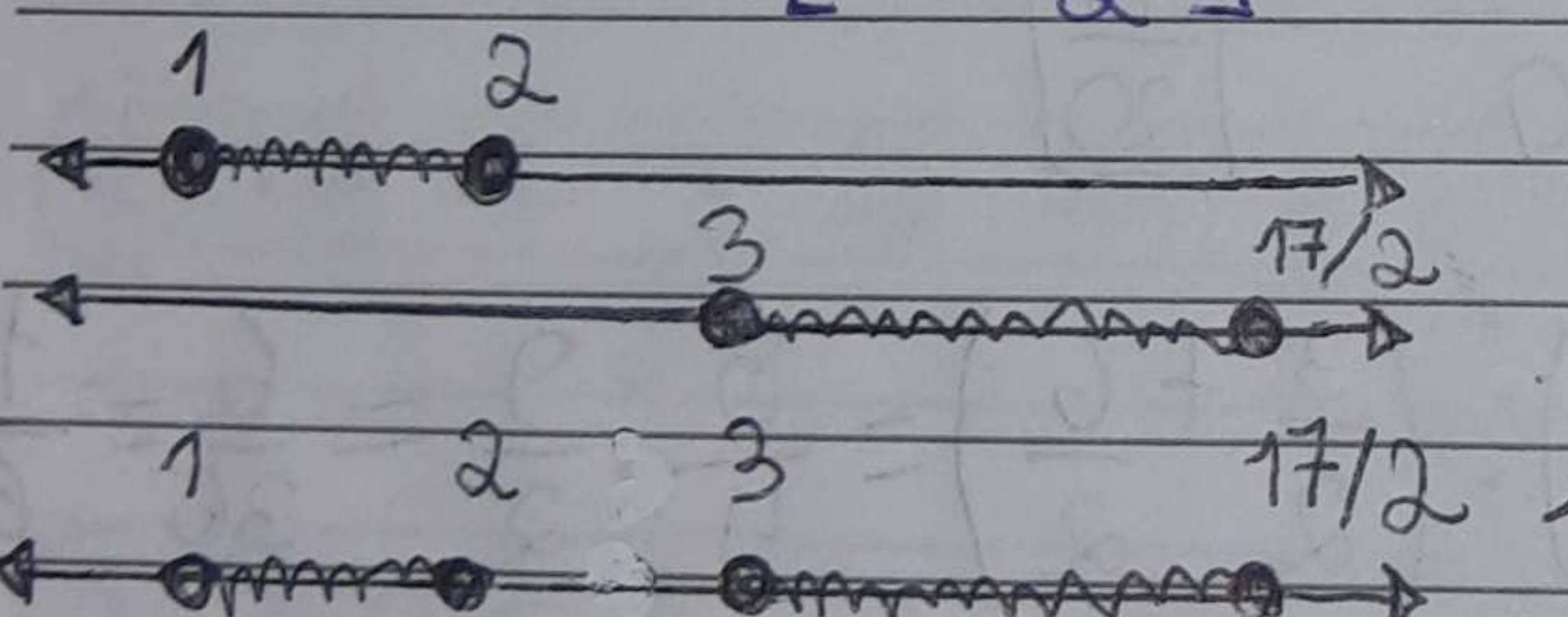
b) $(-1, \frac{2}{5}) \cap (0, \frac{3}{4})$

 $S = \{x \in \mathbb{R} / 0 < x < 2/5\}$

c) $[-2, 3] \cap (3, 6)$

 $S = \emptyset$

d) $[1, 2] \cup [3, \frac{17}{2}]$

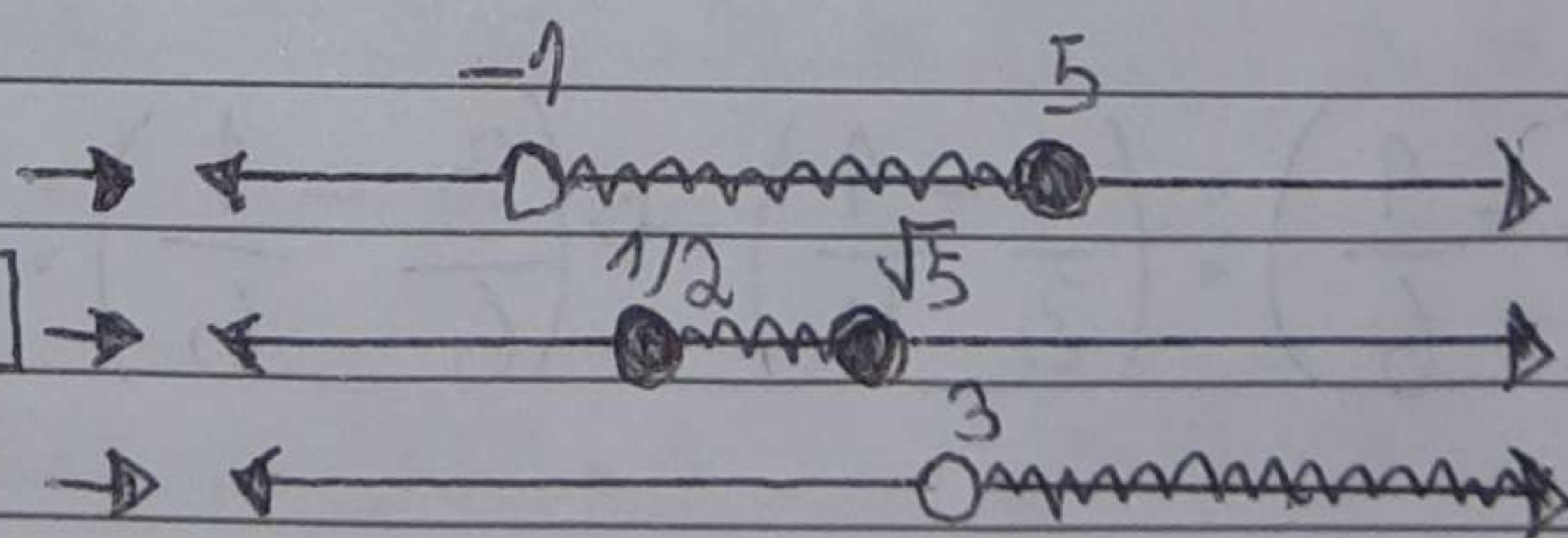
 $S = \{x \in \mathbb{R} / 1 \leq x \leq 2 \text{ ou } 3 \leq x \leq \frac{17}{2}\}$

② a) $A \cup B$

$A = (-1, 5]$

$B = [1/2, \sqrt{5}]$

$C = (3, \infty)$



a) $S = \{x \in \mathbb{R} / -1 < x \leq 5\} \rightarrow A \cup B$

b) $B \cup C \rightarrow S = \{x \in \mathbb{R} / 1/2 \leq x \leq \sqrt{5} \text{ ou } x > 3\}$

c) $A \cap C \rightarrow S = \{x \in \mathbb{R} / 3 < x \leq 5\}$

$$a) 2x - 3 < 7$$

$$x=5 \rightarrow 10 - 3 < 7 \rightarrow 7 < 7$$

FALSO

$$x=0$$

$$2 \cdot 0 - 3 < 7 \rightarrow -3 < 7 \text{ OK}$$

$$x=6 \rightarrow 12 - 3 < 7 \rightarrow 9 < 7$$

FALSO

$$b) 3x - 4 \geq 5$$

$$x=5 \rightarrow 9 - 4 \geq 5 \rightarrow 5 \geq 5 \text{ OK}$$

$$x=0$$

$$-4 \geq 5 \text{ FALSO}$$

$$x=4 \rightarrow 12 - 4 \geq 5 \rightarrow 8 \geq 5 \text{ OK}$$

$$c) -1 < 4x - 1 \leq 11$$

$$x=0$$

$$\rightarrow -1 < -1 \leq 11 \rightarrow \text{FALSO}$$

$$x=1$$

$$\rightarrow -1 < 3 \leq 11 \text{ OK}$$

$$x=2$$

$$\rightarrow -1 < 7 \leq 11 \text{ OK}$$

$$④ a) \frac{1}{2}x + \frac{1}{3} = 1 \rightarrow \frac{1}{2}x = \frac{2}{3}$$

$$\rightarrow x = 4/3$$

$$b) \frac{2x-3}{4} + 5 = 3x \rightarrow \frac{2x-3}{4} + \frac{20}{4} = \frac{12x}{4} \rightarrow \frac{10x}{4} = \frac{17}{4} \rightarrow x = \frac{17}{10}$$

$$c) \frac{t+5}{8} - \frac{t-2}{2} = \frac{1}{3} \rightarrow \frac{t+5}{8} - \frac{t-2}{2} = \frac{1}{3} \rightarrow \frac{t+5}{8} - \frac{4t-8}{8} = \frac{1}{3}$$

$$-\frac{3t}{8} - \frac{3}{8} = \frac{1}{3} \rightarrow \frac{1}{3} + \frac{3}{8} \rightarrow \frac{17}{24} = -\frac{9}{24}t \rightarrow t = -\frac{17}{9}$$

$$\textcircled{5} a) 4x + 5 > 2x - 3$$

$$4x - 2x > -3 - 5 \rightarrow 2x > -8 \rightarrow \boxed{x > -4}$$

$$b) 5(x+3) - 2(x+1) \leq 2x + 3$$

$$5x + 15 - 2x - 2 \leq 2x + 3 \rightarrow 3x + 13 \leq 2x + 3 \rightarrow \boxed{x \leq -10}$$

$$c) 3(x+1) - 2 \geq 5(x-1) - 3(2x-1)$$

$$3x + 3 - 2 \geq 5x - 5 - 6x + 3 \rightarrow 3x + 1 \geq -x - 2 \rightarrow 4x \geq -3$$

$$\boxed{x \geq -\frac{3}{4}}$$

$$d) \frac{x-1}{2} - \frac{x-3}{4} \geq 1$$

$$\frac{x-1}{2} - \frac{x-3}{4} \geq 1 \rightarrow \frac{2x-2}{4} - \frac{x-3}{4} \geq 1 \rightarrow \frac{x-5}{4} \geq 1$$

$$\frac{x}{4} \geq \frac{4+5}{4} \rightarrow \boxed{x \geq 9}$$

$$e) \frac{2x-3}{2} - \frac{5-3x}{3} < \frac{3x-1}{6}$$

$$\frac{6x-9}{6} - \frac{10-6x}{6} < \frac{18x-1}{6} \rightarrow \frac{-19+1}{6} < \frac{18x-1}{6} \rightarrow \frac{-18}{6} < \frac{18x-1}{6}$$

$$\boxed{x > -1}$$

$$f) -2 < 3x - 1 < 4$$

$$3x - 1 > -2 \rightarrow 3x > -1 \rightarrow \boxed{x > -1/3}$$

$$3x - 1 < 4 \rightarrow 3x < 5 \rightarrow \boxed{x < 5/3}$$

$$g) -3 < 3x - 2 < x$$

$$3x - 2 > -3 \rightarrow 3x > -1 \rightarrow \boxed{x > -1/3}$$

$$3x - 2 < x \rightarrow 3x - x < 2 \rightarrow \boxed{x < 1}$$

$$h) x + 1 \leq 7 - 3x < \frac{x}{2} - 1$$

$$x + 1 \leq 7 - 3x \rightarrow 4x \leq 6 \rightarrow \boxed{x \leq 3/2}$$

$$7 - 3x < \frac{x}{2} - 1 \rightarrow \frac{6x - x}{2} < -1 - 7 \rightarrow -7x < 8 \rightarrow \boxed{x > -16/7}$$

$$i) 1 > \frac{3y - 1}{4} > -1$$

$$\frac{3y - 1}{4} < 1 \rightarrow 3y - 1 < 4 \rightarrow 3y < 5 \rightarrow \boxed{y < 5/3}$$

$$\frac{3y - 1}{4} > -1 \rightarrow 3y - 1 > -4 \rightarrow 3y > -3 \rightarrow \boxed{y > -1}$$

$$j) x + 1 < x + 2$$

$$x - x < 2 - 1 \rightarrow \boxed{\text{false}}$$

$$k) x + 1 > x + 2$$

$$x - x > 2 - 1 \rightarrow \boxed{\text{false}}$$

⑥ Conjunto dos pontos cuja distância a 1 é menor do que ou igual a 4.

$$|x-1| \leq 4$$

b) O conjunto dos pontos cuja distância a -5 é menor do que 2.

$$|x-(-5)| < 2$$

c) Conjunto dos pontos cuja distância a 6 é maior do que 3

$$|x-6| > 3$$

d) Conjunto dos pontos cuja distância a -2 é igual a 5

$$|x-(-2)| = 5$$

⑦ a) $| -5 | + | -2 |$
 $5 + 2 = 7$

b) $|a|, a < 0$
 $\hookrightarrow -a$

c) $| -5 + 8 | = | 3 | = 3$

d) $| -a | = a$

e) $| -a |, a > 0$
 $\hookrightarrow a$

f) $| 2a | - | 3a |$
 $2a - 3a = -a$

$$⑧ a) |x-1|=4$$

$$x-1=4 \rightarrow x=5 \quad \text{ou} \quad x-1=-4 \rightarrow x=-3$$

$$Soluções = \{-3, 5\}$$

$$b) x = \pm 2 \rightarrow S = \{-2, 2\}$$

$$c) |x-1|=3-\pi$$

$$x-1 = -3+\pi \rightarrow x = -2+\pi$$

$$S = \emptyset$$

$$x-1 = 3-\pi \rightarrow x = 4-\pi$$

$$d) |x-1|=|x-4|$$

$$x-1 = x-4 \quad \text{ou} \quad x-1 = -x+4$$

$$0 = -3$$

$$2x = 5 \rightarrow x = 5/2$$

$$S = \{5/2\}$$

$$e) |2x-1|=1$$

$$2x-1=1$$

$$\text{ou} \quad 2x-1=-1$$

$$2x=2 \rightarrow x=1$$

$$x=0$$

$$S = \{0, 1\}$$

$$f) |x-3|=|x-4|$$

$$x-3 = x-4$$

$$\text{ou} \quad x-3 = -x+4$$

$$S = \emptyset$$

$$0x = -1$$

$$2x = -7$$

$$g) |x|=4x+1$$

$$x = 4x+1$$

$$\text{ou} \quad x = -4x-1$$

$$-3x = 1 \rightarrow x = -\frac{1}{3}$$

$$5x = -1$$

$$x = -1/5$$

$$S = \{-1/5\}$$

$$\textcircled{9} \text{ a) } |x| \leq 2 \rightarrow S = \{x \in \mathbb{R} / -2 \leq x \leq 2\}$$

$$\text{b) } |x| \geq 2 \rightarrow S = \{x \in \mathbb{R} / -2 \geq x \text{ ou } x \geq 2\}$$

$$\text{c) } |x-1| < 4$$

$$\hookrightarrow x-1 < 4$$

$$x < 5$$

$$\text{ou } x-1 > -4$$

$$\text{ou } x > -3$$

$$\Rightarrow S = \{x \in \mathbb{R} / -3 < x < 5\}$$

$$\text{d) } \frac{|x+2|}{3} \geq 3$$

$$x+2 \geq 9$$

$$x \geq 7$$

$$\text{ou } x+2 \leq -9$$

$$x \leq -11$$

$$\Rightarrow S = \{x \in \mathbb{R} / -11 \geq x \text{ ou } x \geq 7\}$$

$$\text{e) } |x-1| > 3-\pi$$

$$x-1 > 3-\pi$$

$$x > 4-\pi$$

$$\text{ou } x-1 < -3+\pi$$

$$x < -2+\pi$$

$$S = \mathbb{R} = \{x \in \mathbb{R} / \}$$

$$\text{f) } |5x+4| \geq 4$$

$$5x+4 \geq 4$$

$$5x \geq 0$$

$$\text{ou } 5x+4 \leq -4$$

$$\text{ou } 5x \leq -8 \rightarrow x \leq -8/5$$

$$S = \{x \in \mathbb{R} / -8/5 \geq x \text{ ou } x \geq 0\}$$

$$\text{g) } |4-3x|-2 < 4$$

$$|4-3x| < 6$$

$$-3x < 2$$

$$x > -2/3$$

$$\text{ou } |4-3x| > -2$$

$$-3x > -6$$

$$x < 2$$

$$S = \{x \in \mathbb{R} / -2/3 < x < 2\}$$



$$h) |2x-1| > 3,6 \rightarrow 3,6 = \frac{36}{10}$$

$$2x-1 > 36/10$$

$$2x > \frac{18}{5} + \frac{5}{5} = \frac{23}{5} \quad \text{ou} \quad 2x-1 < -36/10$$

$$2x < -\frac{18}{5} + \frac{5}{5} \rightarrow x < -\frac{13}{10}$$

$$2x > \frac{23}{5} \rightarrow x > \frac{23}{10}$$

$$S = \{x \in \mathbb{R} / -13/10 > x \text{ ou } x > 23/10\}$$

$$i) |x+3| \leq 5$$

$$x+3 \leq 5$$

$$x \leq 2$$

$$\text{ou } x+3 \geq -5$$

$$x \geq -8$$

$$\rightarrow S = \{x \in \mathbb{R} / -8 \leq x \leq 2\}$$

$$j) |3-2x|+2 > 5$$

$$3-2x > 3$$

$$-2x > 0$$

$$x < 0$$

$$\text{ou } 3-2x < -7$$

$$-2x < -10$$

$$x > 5$$

$$S = \{x \in \mathbb{R} / 0 > x \text{ ou } x > 5\}$$