

Topicos de Matematica Elementar I

Parte 1 - Conjunto dos Números Racionais

Ficha de Avaliação 1

Exercício 1

$$1.) 2x - 1 = 2 - x \quad (*)$$

$$(*) 2x + x = 2 + 1 \quad (**)$$

$$(**) 3x = 3 \quad (***)$$

$$(***) x = \frac{3}{3} \quad (****)$$

$$(*) x = 1 //$$

$$2.) -x + 10 < 4x - 5 \quad (*)$$

$$(*) -x - 4x < -5 - 10 \quad (**)$$

$$(**) -5x < -15 \quad (***)$$

$$(***) x > \frac{-15}{-5} \quad (****)$$

$$(*) x > 3 //$$

$$3.) \frac{x+1}{x} = -\frac{1}{x} - 1 \quad (*)$$

$$(*) x+1 = -1-x \quad (**)$$

$$(**) x+x = -1-1 \quad (***)$$

$$(***) 2x = -2 \quad (****)$$

$$(*) x = \frac{-2}{2} \quad (*****)$$

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

$$4.) 7 - 2x = x - 5 + \frac{1}{3}x \quad (*)$$

$$(*) -2x - x - \frac{1}{3}x = -5 - 7 \quad (**)$$

$$(**) -6x - 3x - x = -15 - 21 \quad (***)$$

$$(***) -10x = -36 \quad (****)$$

$$(*) x = \frac{-36}{-10} \quad (*****)$$

$$(*) x = 3,6 //$$

Exercício 2

$$1.) \frac{1}{2} \cdot \left(\frac{2}{3} - \frac{1}{7} \right) =$$

$$\left(\frac{1 \times 2}{2 \times 3} \right) - \left(\frac{1 \times 1}{2 \times 7} \right) =$$

$$\frac{2}{6_{(4)}} - \frac{1}{14_{(6)}} =$$

$$\frac{28}{84} - \frac{6}{84} =$$

$$\frac{22}{84} = \frac{11}{42} //$$

$$2.) -\frac{2}{3_{(4)}} + \frac{7}{2_{(5)}} =$$
$$\frac{2}{3} \cdot \frac{1}{5} =$$

$$\frac{-4}{6} + \frac{21}{6} =$$
$$\frac{2}{15}$$

$$\frac{17}{6}$$
$$\frac{2}{15} =$$

$$\frac{17}{6} \cdot \frac{15}{2} = \frac{255}{12} //$$

$$3.) \frac{1}{\frac{3}{4} + 2 \cdot \frac{10}{3}} =$$

$$\frac{1}{\frac{3}{4} + \frac{8}{4} \cdot \frac{10}{3}} =$$

$$\frac{1}{\frac{11}{4} \cdot \frac{10}{3}} =$$

$$\frac{1}{\frac{110}{12}} =$$

$$\frac{1}{1} \cdot \frac{12}{110} =$$

$$\frac{12}{110} = \frac{6}{55} //$$

$$4.) \left(\frac{1}{5_{(3)}} - \frac{2}{9_{(5)}} \right) \cdot \left(2 + \frac{7}{3} \right) =$$

$$\left(\frac{9}{45} - \frac{10}{45} \right) \cdot \left(\frac{6}{3} + \frac{7}{3} \right) =$$

$$-\frac{1}{45} \cdot \frac{13}{3} = -\frac{13}{135}$$

Exercício 3

1.) $|x - 2| = 7$ (1)

(1) $x - 2 = 7 \vee x - 2 = -7$ (2)

(1) $x = 7 + 2 \vee x = -7 + 2$ (2)

(1) $x = 9 \vee x = -5$ //

2.) $-2|3x - 1| + 1 = -5$ (1)

(1) $-2|3x - 1| = -6$ (1)

(1) $|3x - 1| = \frac{-6}{-2}$ (1)

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

(1) $3x - 1 = 3 \vee 3x - 1 = -3$ (1)

(1) $3x = 4 \vee 3x = -2$ (1)

(1) $x = \frac{4}{3} \vee x = -\frac{2}{3}$ //

3.) $|-x| \geq -2$ (1)

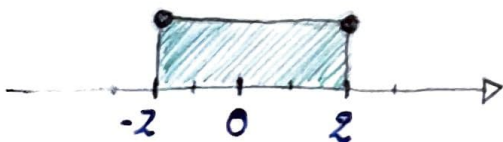
(1) $-2 \leq -x \leq 2$ (1)

(1) $-x \geq -2 \wedge -x \leq 2$ (1)

(1) $x \leq 2 \wedge x \geq -2$ (1)

(1) $-2 \leq x \leq 2$ (1)

(1) $x \in [-2, 2]$ //



4.) $-2 + |x + 1| < 10$ (1)

(1) $|x + 1| < 12$ (1)

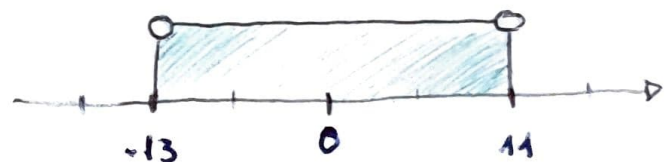
(1) $-12 < x + 1 < 12$ (1)

(1) $x + 1 < 12 \vee x + 1 > -12$ (1)

(1) $x < 11 \vee x > -13$ (1)

(1) $-13 < x < 11$ (1)

(1) $x \in]-13, 11[$ //



Exercício 4

1.) w = onda de rádio

f = frequência

w é o produto do inverso de f e 300 000:

$$w = \frac{1}{f} \cdot \frac{300\,000}{1}$$

2.) frequência $\times 2$

vs.

frequência $: 2$

$$w = \frac{300\,000}{2f}$$

$$\Rightarrow w = \frac{300\,000}{2} \cdot \frac{1}{f}$$

$$\Rightarrow w = \frac{150\,000}{f} //$$

$$w = \frac{300\,000}{\frac{f}{2}}$$

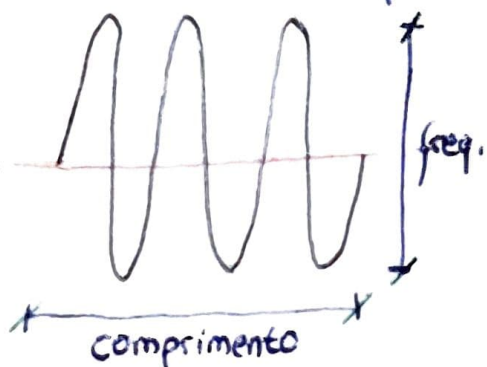
$$w = \frac{300\,000}{1} \cdot \frac{2}{f}$$

$$w = \frac{600\,000}{f} //$$

Quanto maior a frequência da onda, menor o comprimento de onda.

Logo, com o dobro da frequência, o comprimento reduz para metade.

E assim, quando a frequência é reduzida para metade, o comprimento duplica.



vs.



$$3.) \quad \omega = \frac{300\,000}{f} \quad (*)$$

$$\Rightarrow \omega = \frac{1}{f} \cdot \frac{300\,000}{1} \quad (*)$$

$$\Rightarrow \frac{1}{\omega} = f \cdot \frac{1}{300\,000} \quad (*)$$

$$\Rightarrow \frac{\frac{1}{\omega}}{\frac{1}{300\,000}} = f \quad (*)$$

$$\Rightarrow f = \frac{300\,000}{\omega}$$

$$\boxed{f = \frac{300\,000}{\omega}}$$

$$4.) \quad \omega = 1500$$

$$f = \frac{300\,000}{1500} \quad (*)$$

$$\Rightarrow f = \frac{3000}{15} \quad (*)$$

$$\Rightarrow f = \frac{300}{\frac{1}{3}} \quad (*)$$

$$\Rightarrow f = \frac{600}{3} \quad (*)$$

$$\Rightarrow f = 200 \text{ kilociclos/s}$$

Exercício 5

$$\begin{array}{l} 2h \quad -10^\circ\text{C} \\ 1h \quad x \end{array}$$

$$2x = -10 \times 1 \quad (*)$$

$$\Rightarrow x = \frac{-10}{2} \quad (*)$$

$$\Rightarrow x = -5 //$$

$$\text{Portanto: } -\frac{10}{2} = -5^\circ\text{C/h}$$

A cada hora que passa, a temperatura diminui 5°C.