

Topicos de Matemática
Elementar I

17.3Parte 1 - Conjunto dos Números RacionaisFicha de Avaliação 1Exercício 1

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

(1) $2x + x = 2 + 1$ (1)

(1) $3x = 3$ (1) ✓

(1) $x = \frac{3}{3}$ (1)

(1) $x = 1$ //

1.0

2.) $-x + 10 < 4x - 5$ (1)

(1) $-x - 4x < -5 - 10$ (1)

(1) $-5x < -15$ (1)

(1) $x > \frac{-15}{-5}$ (1)

(1) $x > 3$ //

✓

1.0

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

(1) $x+1 = -1-x$ (1)

(1) $x+x = -1-1$ (1)

(1) $2x = -2$ (1) ✓

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

(1) $x = -1$ //

✓

1.0

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

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

(1) $-6x - 3x - x = -15 - 21$ (1)

(1) $-10x = -36$ (1) ✓

(1) $x = \frac{-36}{-10}$ (1)

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

✓

1.0

Exercício 2

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

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

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

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

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

1.0

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

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

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

$$\frac{17}{6} \cdot \frac{15}{2} = \frac{255}{12} = \frac{85}{4} \checkmark$$

1.0

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

$$\frac{1}{\frac{3}{4} + \left(\frac{8}{4} \cdot \frac{10}{3} \right)} = \checkmark$$

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

0.5

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

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

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

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

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

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

1.0

Exercício 3

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

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

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

(c) $x = 9 \vee x = -5$

1.5

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

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

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

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

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

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

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

1.5

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

(a) ~~$-2 \leq -x \leq 2$~~

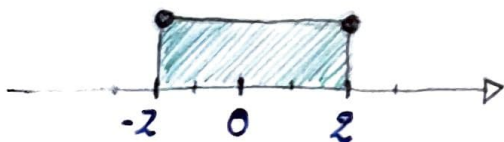
(b) $-x \geq -2 \wedge -x \leq 2$

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

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

(e) $x \in [-2, 2]$

$-x > -2 \vee -x \leq 2$



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

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

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

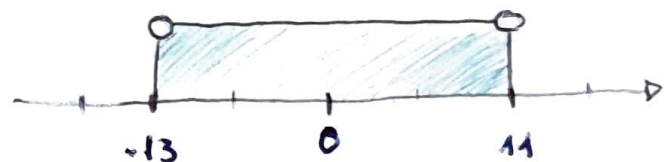
(c) $x+1 < 12 \vee x+1 > -12$

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

(e) $-13 < x < 11$

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

1.5



Exercício 4

1.) w = onda de rádio

f = frequência

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

0.3

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

proporção inversa

2.) frequência $\times 2$

vs.

frequência $: 2$

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

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

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

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

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

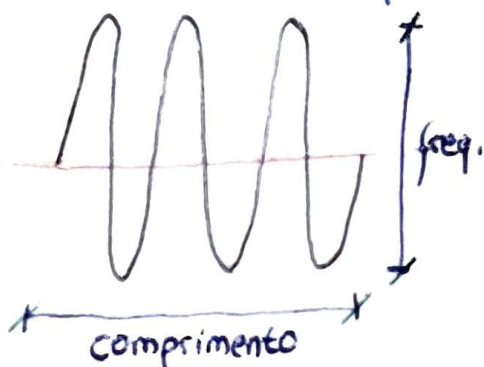
$$w = \frac{600\,000}{f}$$

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

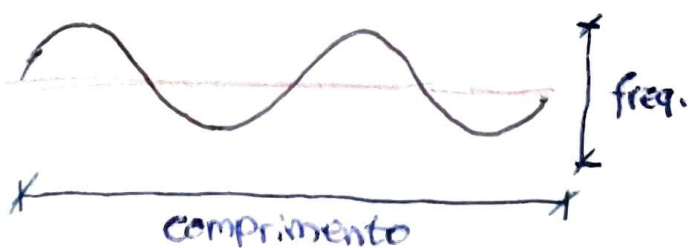
Logo, com o dobro da frequência, o comprimento reduz para metade.

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

1.0



vs.



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

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

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

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

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

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

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

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

$$(*) \quad f = \frac{3000}{15} \quad (*) \quad :10$$

$$(*) \quad f = \frac{300}{\frac{1}{\frac{3}{2}}} \quad (*)$$

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

$$(*) \quad f = 200 \text{ kilociclos/s}$$

Exercício 5

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

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

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

$$(*) \quad x = -5$$

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

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