

Proporcionalidade

01 Grandezas Diretamente Proporcionais

(a regra de três)

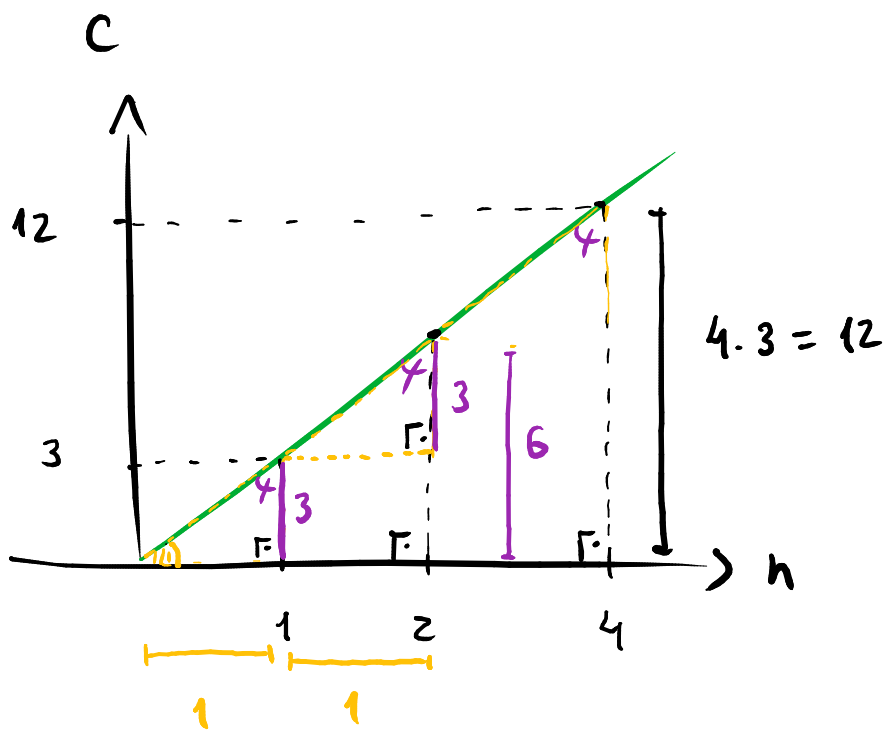
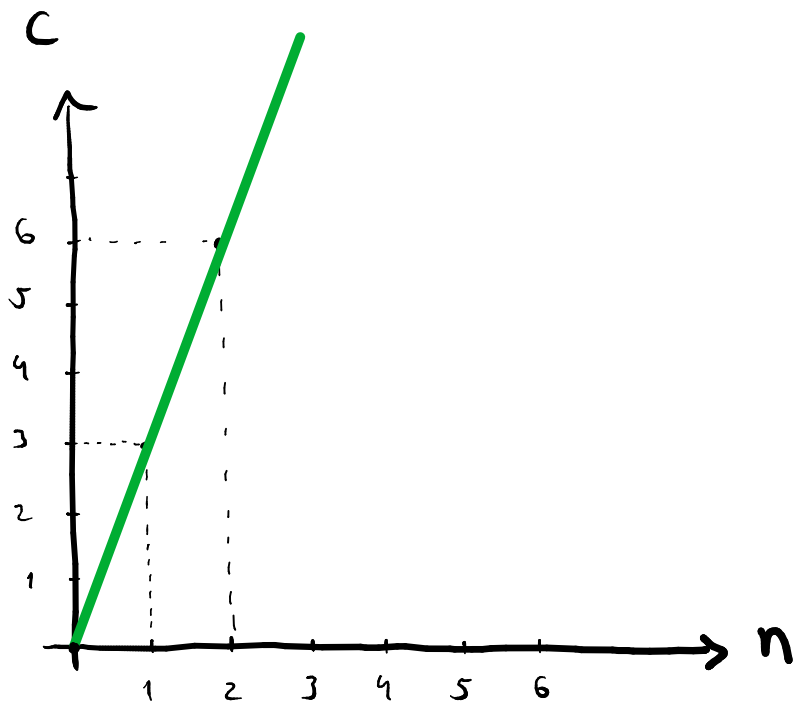
↳ a razão entre elas é constante:

$$\frac{A}{B} = K \quad \text{--->} \quad A = K \cdot B$$

constante

Ex.: $C = 3 \cdot n$

C	n
3	1
6	2
12	4
18	6
36	12



Ex.: Um carro percorre a distância de 200 km em 3 horas.

Quanto tempo ele levará p/ percorrer 1000 km?

$$\frac{D}{T} = K$$

$$\Rightarrow \frac{200 \text{ km}}{3 \text{ h}} = \frac{1000 \text{ km}}{x} \quad \therefore \cancel{2} \cdot \frac{2}{3} = \frac{10 \cdot 3}{x}$$

$$2 = \frac{30}{x} \quad \therefore 2x = 30 \quad \therefore \boxed{x = 15 \text{ h}}$$

Exemplos:

$$\frac{A}{B} = k$$

$$A = k \cdot B$$

$$i) \quad d = v \cdot t$$

$$ii) \quad V = R \cdot i$$

$$iii) \quad F = m \cdot a$$

$$iv) \quad v = \lambda \cdot f$$

fixo

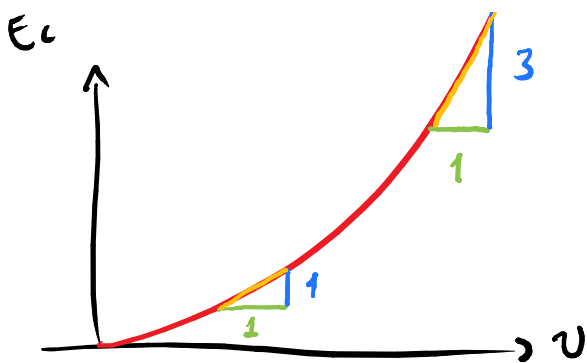
$$v) \quad v = \lambda \cdot f$$

fixo

$$vi) \quad E_c = \frac{1}{2} m v^2$$

fixo

não são D.P.



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#02 Grandezas Inversamente Proporcionais

↳ o produto entre elas é constante:

$$A \cdot B = K \quad \text{--->} \quad A = \frac{K}{B}$$

constante
↑

Ex.: $y = \frac{1}{x}$

y	x
1	1
1/2	2
1/3	3
1/9	9

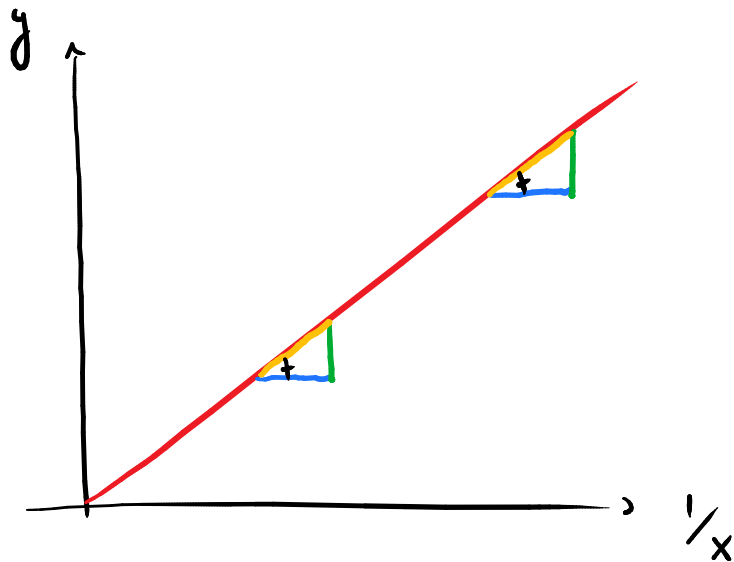
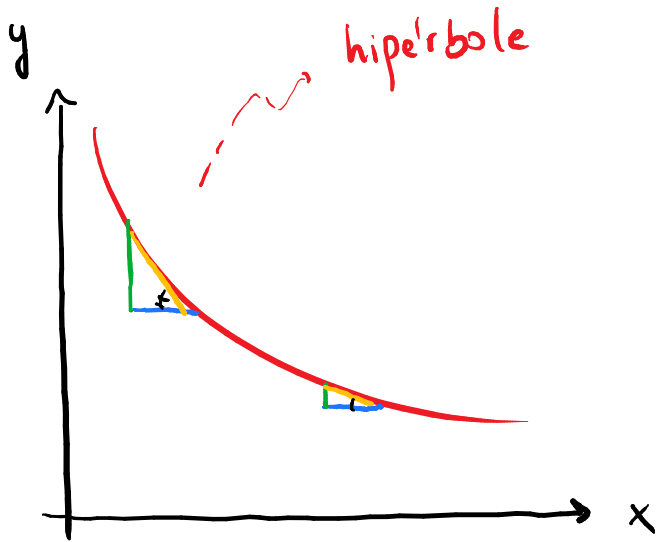
x 1/3

Num gráfico:

$$y = \frac{1}{x}$$

$$y = 1 \cdot \boxed{\frac{1}{x}}$$

$$y = 1 \cdot \boxed{B}$$



Ex : 12 operários levantam uma casa em 60 dias.

Com 18 operários quanto tempo deve demorar para concluir a mesma obra?

$$t = \frac{K}{N_{op}} \quad \therefore \quad N_{op} \cdot t = K$$

$$N_{op} \cdot t = K = 12 \cdot 60 = 18 \cdot x \quad \therefore \quad x = \frac{12 \cdot 60}{18}$$

$$x = 40 \text{ dias}$$

————— " ————— "

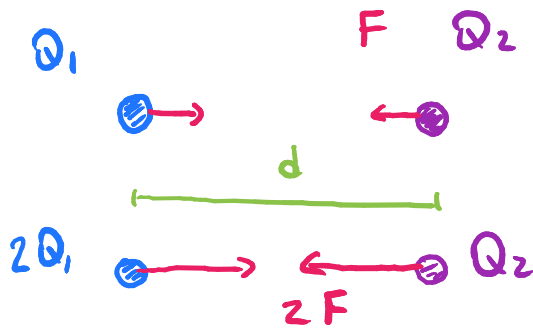
#03 Outros tipos de proporcionalidade

Exemplos

1)
$$F = \frac{K Q_1 Q_2}{d^2}$$

D.P.

$\times 2$ $\times 2$



2)
$$F = \frac{K Q_1 Q_2}{d^2}$$

$\times 1/4$

$\times 2$

$$3) \quad T = 2\pi \sqrt{\frac{3}{K}} \quad \times 4$$

(Note: In the original image, 'T' is boxed with a red dashed line and has a red arrow pointing down to 'x2'. The '3' in the numerator is also boxed with a red dashed line and has a red arrow pointing right to 'x4'.)

constante

$$4) \quad T^2 = K R^3$$

(Note: In the original image, 'T' has a red dashed arrow pointing down to 'x8'. 'K' has a green dashed arrow pointing up to the word 'constante'. 'R' has a red dashed arrow pointing down to 'x4'.)

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