

Resoluções das atividades

Aula 1

Teorema de Tales



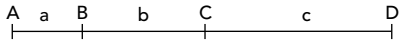
ATIVIDADES PARA SALA

01 $10x - 22 = 7x + 17$ $10x - 22 = 10 \cdot 13 - 22 =$
 $10x - 7x = 17 + 22$ $130 - 22 = 108$
 $3x = 39$ $\overline{DF} = 2 \cdot 108$
 $x = 13$ $\overline{DF} = 216$

02 a) $\frac{\overline{AM}}{\overline{MB}} = 1$
 b) É possível afirmar que o ponto N é o ponto médio de $\overline{CD}$, pois $\overline{CN} = \overline{ND}$.

03 a) $\frac{x}{12} = \frac{3}{4} \Rightarrow x = 9$
 b) $\frac{10^2}{x+1} = \frac{15^3}{3x-6}$
 $6x - 12 = 3x + 3 \Rightarrow 6x - 3x = 3 + 12$
 $3x = 15 \Rightarrow x = 5$

04 $\frac{6}{x} = \frac{2}{x}$
 $x = 12$

05 
 $\frac{9 \cdot 360}{10 \cdot 400} = \frac{a}{120} \Rightarrow 10a = 1080 \Rightarrow a = 108 \text{ m}$



ATIVIDADES PROPOSTAS

01 $\frac{x+4}{2x} = \frac{x+1}{x+4}$
 $2x^2 + 2x = x^2 + 8x + 16$
 $x^2 - 6x - 16 = 0$
 $(x+2)(x-8) = 0$
 $x+2 = 0 \Rightarrow x = -2$
 ou
 $x-8 = 0 \Rightarrow x = 8$
 Como $x > 0$, então:
 $x = 8$
 $\overline{AB} = x + 4$
 $\overline{AB} = 8 + 4$
 $\overline{AB} = 12$

02 a) $\frac{4}{1} = \frac{x}{9} \Rightarrow \frac{4}{3} = \frac{x}{9} \Rightarrow \frac{4x}{3} = \frac{36}{9}$

$8x = 27 \Rightarrow x = \frac{27}{8}$

b) $\frac{39^3}{x} = \frac{13^1}{3} \Rightarrow x = 9$

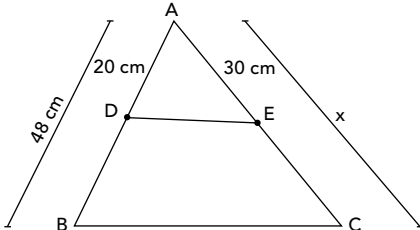
03 $\frac{30^2}{4x} = \frac{45^3}{5x+2}$ $\overline{EF} = 5x + 2 = 5 \cdot 2 + 2 = 12$
 $12x = 10x + 4$ $\overline{EC} = 4x = 4 \cdot 2 = 8$
 $2x = 4$ $\overline{EF} + \overline{EC} = 12 + 8 = 20$
 $x = 2$

04 E
 $\frac{2x}{5} = \frac{18}{y} \Rightarrow \frac{2xy}{5} = 18x$

$\frac{2y}{5} = 18 \Rightarrow \frac{y}{5} = 9 \Rightarrow y = 45$

$\overline{AC} = 18 + 45 = 63$

05 D
 $\frac{x-7}{x-6} = \frac{x}{x+2}$
 $x^2 + 2x - 7x - 14 = x^2 - 6x$
 $x^2 - 5x - 14 = x^2 - 6x$
 $6x - 5x = 14$
 $x = 14$

06  $\frac{x}{30} = \frac{48}{20}$
 $2x = 144$
 $x = 72$
 $\overline{AC} = 72 \text{ cm}$

07 $\frac{405}{22} = \frac{486}{x}$

$5x = 132$

$x = 26,4 \text{ m}$

$\triangle ABO$ e $\triangle CDO$ são semelhantes, logo:

$$\frac{\overline{OB}}{\overline{AB}} = \frac{\overline{OE}}{\overline{CE}} \Rightarrow \frac{20^5}{16^4} = \frac{16}{x}$$

$$5x = 64$$

$$x = 12,8$$

$$\overline{CD} = \overline{ED} + \overline{CE}$$

$$\overline{CD} = 16 + 12,8 = 28,8 \text{ cm}$$

$$2p = 4 \cdot 28,8 = 115,2 \text{ cm}$$

$$A = (28,8)^2 = 829,44 \text{ cm}^2$$

Aula 3

Semelhança II

ATIVIDADES PARA SALA

01 a) $\frac{y}{12} = \frac{x}{6} = \frac{5}{10} \Rightarrow y = 6$
 $x = 3$

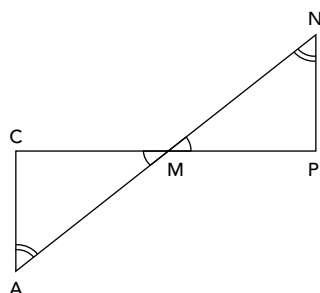
b) $\frac{x}{4,8} = \frac{6}{8} = \frac{4,8}{y} \Rightarrow \frac{x}{4,8} = \frac{3}{4} \Rightarrow 4x = 14,4$

$$x = 3,6$$

$$\frac{4,8}{y} = \frac{3}{4} \Rightarrow 3y = 19,2$$

$$y = 6,4$$

02



Caso AA $\Rightarrow \triangle AMC \cong \triangle NMP$
 $\widehat{CMA} \cong \widehat{PMN}$ (O.P.V.)
 $\widehat{CAM} \cong \widehat{PNM}$ (alternos internos)

03 V, V, F, V, F

(V) $\frac{H}{h} = \frac{S}{s}$

(V) $\frac{H}{S} = \frac{h}{s}$

(F) $\frac{50^{10}}{15^3} = \frac{S}{10} \Rightarrow 3S = 100 \Rightarrow S = \frac{100}{3}$

(V) $\frac{H \cdot S}{S \cdot S} = \frac{h \cdot s}{s \cdot s} \Rightarrow \frac{H \cdot S}{h \cdot s} = \frac{S \cdot S}{s \cdot s} \Rightarrow \frac{H \cdot S}{h \cdot s} = \left(\frac{S}{s}\right)^2$

(F) Se $S = \frac{s}{2} \Rightarrow s = 2S \Rightarrow \frac{H}{h} = \frac{S}{2S} \Rightarrow H = \frac{h}{2}$

04 $\frac{2x}{3x} = \frac{x}{x+2}$

$$3x = 2x + 4$$

$$x = 4 \text{ cm}$$

$$\text{Logo, } 2p = 27 \text{ cm}$$

05 $\frac{y+4}{y} = \frac{x+6}{6} = \frac{3}{2}$

$$\overline{AC} = 9$$

$$\overline{BC} = 12$$

$$\overline{DE} = 8$$

$$3y = 2y + 8 \Rightarrow y = 8$$

$$2x + 12 = 18 \Rightarrow 2x = 6 \Rightarrow x = 3$$



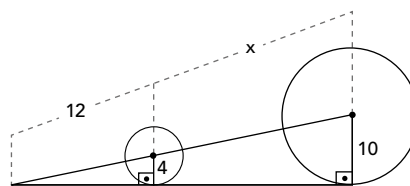
ATIVIDADES PROPOSTAS

01 $\frac{\ell}{116} = \frac{130}{805} \Rightarrow 5\ell = 130 \Rightarrow \ell = 26 \text{ m}$

02 $\frac{a}{x} = \frac{d}{a} \therefore a^2 = x \cdot d$

03 $\frac{6}{4x} = \frac{6x+10}{\frac{20}{3}x+36} \Rightarrow 24x^2 + 40x = 40x + 216$
 $24x^2 = 216 \Rightarrow x^2 = 9$
 $x = 3 \text{ cm}$

04



$$\frac{x+12}{123} = \frac{10}{41}$$

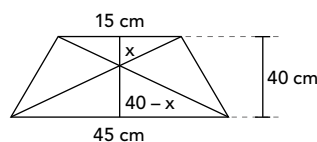
$$x + 12 = 30$$

$$x = 18 \Rightarrow \overline{O_1O_2} = 18$$

05 a) $\frac{x+8}{28} = \frac{x+9+12}{123}$
 $3 \cdot (x+8) = 2 \cdot (x+21)$
 $3x + 24 = 2x + 42$
 $x = 18$

b) $\frac{y}{9} = \frac{x}{10} = \frac{1}{18} = \frac{1}{3}$
 $y = 3$
 $x = \frac{10}{3}$

06



$$\frac{x}{40-x} = \frac{15^1}{453}$$

$$3x = 40 - x$$

$$4x = 40$$

$$x = 10 \text{ cm}$$

Portanto, as diagonais se cortam a 10 cm da base menor.

07 $\frac{9}{8} = \frac{x}{5} \Rightarrow 8x = 45 \Rightarrow x = \frac{45}{8} \text{ cm}$

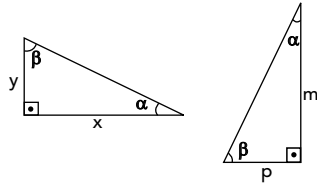
Aula 4

Semelhança III

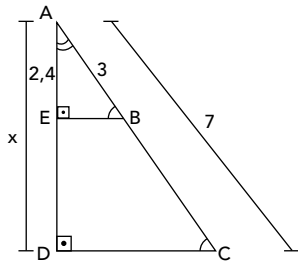
ATIVIDADES PARA SALA

01 B

$$\frac{y}{p} = \frac{x}{m} \Rightarrow \frac{x}{y} = \frac{m}{p}$$



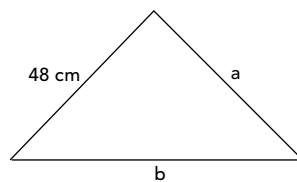
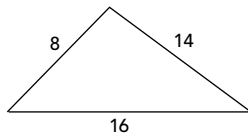
02 D



$$\frac{x}{2.4} = \frac{7}{3}$$

$$x = 5,6$$

03



$$\frac{8}{48} = \frac{14}{a} = \frac{16}{b}$$

$$a = 6 \cdot 14 = 84 \text{ cm}$$

$$b = 6 \cdot 16 = 96 \text{ cm}$$

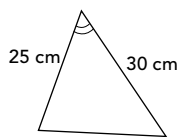
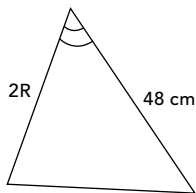
04 D

$$\frac{10}{24} = \frac{x}{20} \Rightarrow 12x = 100 \text{ (:4)}$$

$$3x = 25$$

$$x = \frac{25}{3}$$

05



$$\frac{2R}{25} = \frac{48}{30}$$

$$R \cdot 2R = 25 \cdot 8 \text{ (:5)}$$

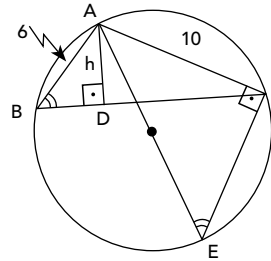
$$2R = 5 \cdot 8$$

$$R = 5 \cdot 4 = 20 \text{ cm}$$



ATIVIDADES PROPOSTAS

01



$\overline{AE}$ = Diâmetro = 30 cm

$$\frac{h}{10} = \frac{6}{30}$$

$$5h = 10$$

$$h = 2 \text{ cm}$$

02

$$a) \frac{a}{36} = \frac{24}{36} \Rightarrow \frac{a}{36} = \frac{2}{3} \therefore a = 24$$

$$\frac{24}{b} = \frac{2}{3} \therefore b = 36$$

$$b) \frac{a}{21} = \frac{8}{17} \Rightarrow \frac{a}{21} = \frac{8}{17} \therefore a = \frac{168}{17}$$

$$\frac{20}{b} = \frac{8}{17} \therefore b = \frac{85}{2}$$

03

$$\frac{y}{12} = \frac{x}{6} = \frac{5}{9}$$

$$\frac{y}{12} = \frac{5}{9} \Rightarrow 3y = 20 \therefore y = \frac{20}{3}$$

$$\frac{x}{6} = \frac{5}{9} \Rightarrow 3x = 10 \therefore x = \frac{10}{3}$$

$$\text{Assim, } x + y = \frac{10}{3} + \frac{20}{3} = \frac{30}{3} = 10$$

04

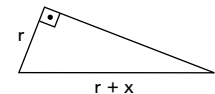
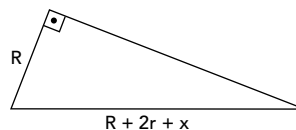
$$\frac{x}{3} = \frac{40-x}{4} \Rightarrow 2x = 120 - 3x$$

$$5x = 120$$

$$x = 24$$

$$A_{\text{galpão}} = 24 \cdot 12 = 288 \text{ m}^2$$

05 C



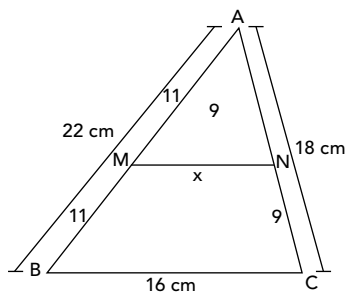
$$\frac{R}{r} = \frac{R+2r+x}{r+x}$$

$$Rr + Rx = Rr + 2r^2 + rx$$

$$Rx - rx = 2r^2 \Rightarrow x(R-r) = 2r^2$$

$$x = \frac{2r^2}{R-r}$$

06



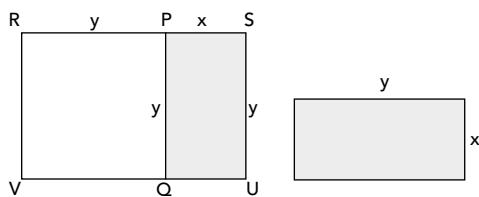
M e N são pontos médios.

$$\frac{11}{22} = \frac{9}{18} = \frac{x}{16} \therefore 18x = 144$$

$$x = 8 \text{ cm}$$

$$2P_{\triangle AMN} = 11 + 9 + 8 = 28 \text{ cm}$$

07 B



$$\frac{y+x}{y} = \frac{y}{x} \therefore y^2 = xy + x^2$$

$$x^2 + xy - y^2 = 0$$

$$x^2 + yx - y^2 = 0$$

$$\Delta = y^2 - 4 \cdot 1 \cdot (-y^2)$$

$$\Delta = y^2 + 4y^2 \therefore \Delta = 5y^2$$

$$x = \frac{-y \pm y\sqrt{5}}{2}$$

Logo:

$$\frac{RS}{PQ} = \frac{y+x}{y} = \frac{y + \left(\frac{-y + y\sqrt{5}}{2} \right)}{y} =$$

$$\frac{2y - y + y\sqrt{5}}{2} \cdot \frac{1}{y} = \frac{y + y\sqrt{5}}{2y} =$$

$$\frac{y(1+\sqrt{5})}{2y} = \frac{1+\sqrt{5}}{2}$$

Aula 5

Teorema de Pitágoras I



ATIVIDADES PARA SALA

- 01 a) $x^2 = 12^2 + 9^2$ b) $(2x)^2 = x^2 + (3\sqrt{3})^2$
 $x^2 = 144 + 81$ $4x^2 = x^2 + 27$
 $x^2 = 225$ $3x^2 = 27$
 $x = 15$ $x^2 = 9$
 $x = 3$

02 $n^2 + 3^2 = 5^2$

$$n^2 = 25 - 9$$

$$n^2 = 16$$

$$n = 4$$

$$m^2 = 8^2 + 15^2$$

$$m^2 = 64 + 225$$

$$m^2 = 289$$

$$m = 17$$

03 $\overline{EF}^2 = 12^2 + 16^2$

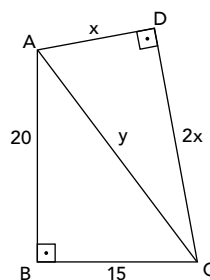
$$\overline{EF}^2 = 144 + 256$$

$$\overline{EF}^2 = 400$$

$$\overline{EF} = 20 \text{ cm}$$

$$2p = 4 \cdot 20 = 80 \text{ cm}$$

04



$$y^2 = 20^2 + 15^2$$

$$y^2 = 400 + 225$$

$$y^2 = 625$$

$$(2x)^2 + x^2 = y^2$$

$$4x^2 + x^2 = y^2$$

$$5x^2 = 625$$

$$x^2 = 125$$

$$x = 5\sqrt{5}$$

$$\overline{AD} = 5\sqrt{5}$$

05 $x^2 = (1,5)^2 + 2^2$

$$x^2 = 2,25 + 4$$

$$x^2 = 6,25$$

$$x = 2,5 \text{ m}$$

Portanto, Mateus precisa de uma tábua de 2,5 m.



ATIVIDADES PROPOSTAS

01 $(6 + 4)^2 = \overline{AB}^2 + (6 - 4)^2$

$$10^2 = \overline{AB}^2 + 2^2$$

$$\overline{AB}^2 = 100 - 4$$

$$\overline{AB}^2 = 96$$

$$\overline{AB} = 4\sqrt{6} \text{ cm}$$

02 $(x + 6)^2 = x^2 + (4\sqrt{6})^2$

$$x^2 + 12x + 36 = x^2 + 96$$

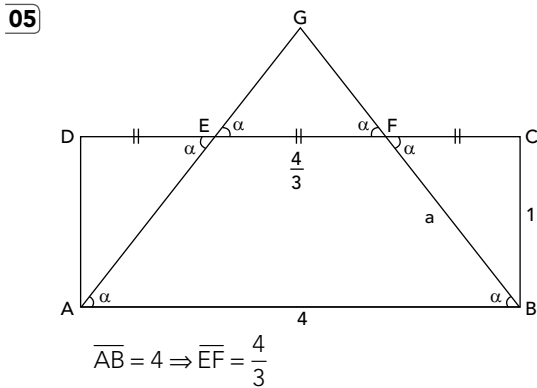
$$12x = 60$$

$$x = 5$$

$$\text{Logo, } 2p_{\triangle ABC} = 5 + 11 + 4\sqrt{6} = 16 + 4\sqrt{6} = 4(4 + \sqrt{6}).$$

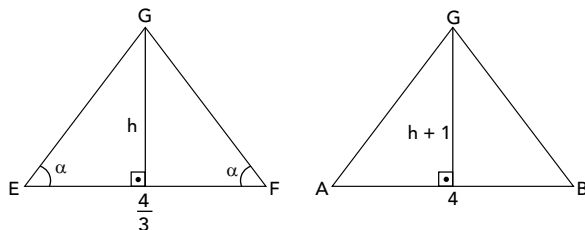
03 $55^2 = 5^2 + h^2$
 $3025 = 25 + h^2$
 $h^2 = 3000$
 $h = \sqrt{3000}$
 $h = 10\sqrt{30}$
 $h = 10 \cdot 5,47$
 $h = 54,70 \text{ m}$

04 $h^2 + \left(\frac{\ell}{2}\right)^2 = \ell^2$
 $h^2 = \ell^2 - \frac{\ell^2}{4}$
 $h^2 = \frac{4\ell^2 - \ell^2}{4}$
 $h^2 = \frac{3\ell^2}{4}$
 $h = \sqrt{\frac{3\ell^2}{4}} \therefore h = \frac{\ell\sqrt{3}}{2}$



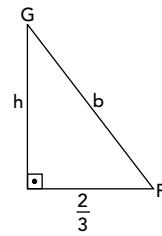
$a^2 = \left(\frac{4}{3}\right)^2 + 1^2$
 $a^2 = \frac{16}{9} + 1$
 $a^2 = \frac{25}{9} \therefore a = \frac{5}{3}$

Nas figuras, $\triangle EGF \sim \triangle AGB$.



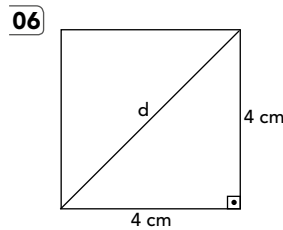
$\frac{h}{h+1} = \frac{\frac{4}{3}}{4} \therefore 4h = \frac{4h+4}{3}$
 $12h = 4h+4$
 $8h = 4 \therefore h = \frac{1}{2}$

Logo:

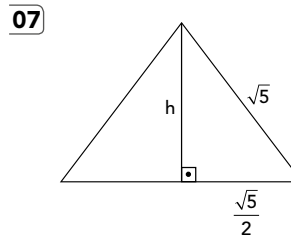


$b^2 = \left(\frac{1}{2}\right)^2 + \left(\frac{2}{3}\right)^2$
 $b^2 = \frac{1}{4} + \frac{4}{9} = \frac{9+16}{36} = \frac{25}{36}$
 $b = \frac{5}{6}$

Então: $\overline{BG} = a + b = \frac{5}{3} + \frac{5}{6} = \frac{15}{6} = \frac{5}{2}$



$d^2 = 4^2 + 4^2$
 $d^2 = 16 + 16$
 $d^2 = 2 \cdot 16$
 $d = \sqrt{2 \cdot 16}$
 $d = 4\sqrt{2} \text{ cm}$



$h^2 + \left(\frac{\sqrt{5}}{2}\right)^2 = (\sqrt{5})^2$
 $h^2 + \frac{5}{4} = 5$
 $h^2 = 5 - \frac{5}{4}$
 $h^2 = \frac{15}{4} \therefore h = \sqrt{\frac{15}{4}} \therefore h = \frac{\sqrt{15}}{2}$

Aula 6

Teorema de Pitágoras II



ATIVIDADES PARA SALA

01 a) $x^2 = 8^2 + 4^2$
 $x^2 = 64 + 16$
 $x^2 = 80$
 $x = 4\sqrt{5}$

b) $(R+3)^2 = R^2 + (\sqrt{15})^2$
 $R^2 + 6R + 9 = R^2 + 15$
 $6R = 6$
 $R = 1$
 $D = 2R = 2 \cdot 1 = 2$

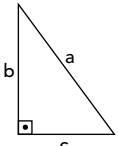
02 $x^2 + 3^2 = (9 - x)^2$
 $x^2 + 9 = 81 - 18x + x^2$
 $18x = 72$
 $x = 4 \text{ m}$

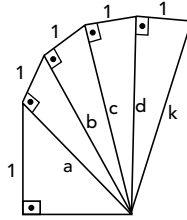
03 $\overline{AH}^2 + 12^2 = 13^2$ $\overline{BQ}^2 + 12^2 = 20^2$ $B = 5 + 25 + 16$
 $\overline{AH}^2 = 169 - 144$ $\overline{BQ}^2 = 400 - 144$ $B = 46$
 $\overline{AH} = 5$ $\overline{BQ} = 16$

04 I. $h^2 + x^2 = 16^2$
 $h^2 + x^2 = 256$

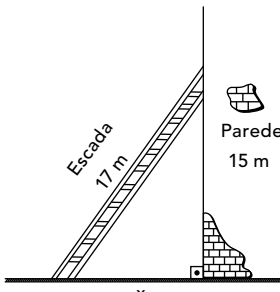
II. $h^2 + (14 - x)^2 = 12^2$
 $\frac{h^2 + x^2}{256} + 196 - 28x = 144$
 $256 + 196 - 28x = 144$
 $-28x = -308 \therefore x = 11$

Substituindo x em (I): $h^2 + 11^2 = 256 \therefore h^2 = 256 - 121$
 $\therefore h^2 = 135 \therefore h = 3\sqrt{15} \text{ cm}$

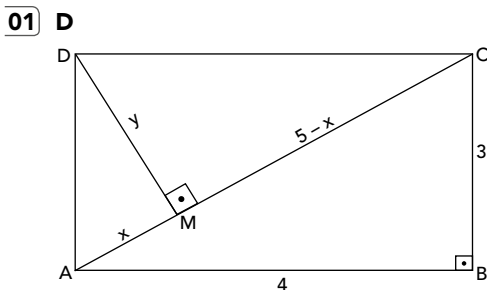
05  $\frac{b^2 + c^2}{a^2} + a^2 = 578$
 $a^2 + a^2 = 578$
 $2a^2 = 578 \therefore$
 $a^2 = 289$
 $a = 17$

02  $\blacksquare a = \sqrt{2}$ $\blacksquare k^2 = d^2 + 1^2$
 $\blacksquare b^2 = a^2 + 1^2$ $k^2 = 5 + 1$
 $b^2 = 2 + 1$ $k = \sqrt{6}$
 $b = \sqrt{3}$
 $\blacksquare c^2 = b^2 + 1^2$
 $c^2 = 3 + 1$
 $c = \sqrt{4}$
 $c = 2$
 $\blacksquare d^2 = c^2 + 1^2$
 $d^2 = 4 + 1$
 $d = \sqrt{5}$

03 $d = \ell\sqrt{2}$
 $5\sqrt{3} = \ell\sqrt{2}$
 $\ell = \frac{5\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{6}}{2} \text{ m}$
 $2p = 4 \cdot \frac{5\sqrt{6}}{2} \therefore 2p = 10\sqrt{6} \text{ m}$

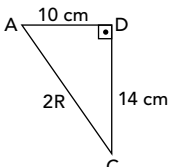
04  $x^2 = 17^2 - 15^2$
 $x^2 = 289 - 225$
 $x^2 = 64$
 $x = 8 \text{ m}$

ATIVIDADES PROPOSTAS

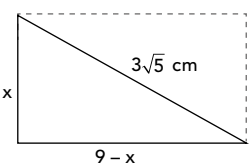


$(\overline{AC})^2 = 3^2 + 4^2$
 $\overline{AC}^2 = 9 + 16$
 $\overline{AC} = 5$

I. $x^2 + y^2 = 9$
 II. $(5 - x)^2 + y^2 = 4^2$
 $25 - 10x + x^2 + y^2 = 16$
 $25 - 10x + 9 = 16$
 $-10x = -18$
 $x = \frac{9}{5} \therefore \text{Logo, } \overline{AM} = x = \frac{9}{5}$

05  $(2R)^2 = 14^2 + 10^2$
 $4R^2 = 196 + 100$
 $4R^2 = 296$
 $R^2 = 74 \therefore R = \sqrt{74} \text{ cm}$

06 $(x + 3)^2 = (x + 1)^2 + 3^2$
 $x^2 + 6x + 9 = x^2 + 2x + 1 + 9$
 $4x = 1 \therefore x = \frac{1}{4} \therefore x = 0,25$
 $2p = 3 + (0,25 + 3) + (0,25 + 1)$
 $2p = 7,5$

07  $(9 - x)^2 + x^2 = (3\sqrt{5})^2$
 $81 - 18x + x^2 + x^2 = 45$
 $2x^2 - 18x + 36 = 0$
 $x^2 - 9x + 18 = 0$
 $(x - 3) \cdot (x - 6) = 0 \therefore x = 3 \text{ ou } x = 6$
 As medidas do retângulo são 3 cm, 3 cm, 6 cm e 6 cm.

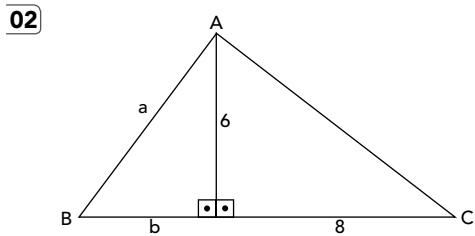
Aula 7

Relações métricas no triângulo retângulo



ATIVIDADES PARA SALA

01 a) $a^2 = 5 \cdot 12$ b) $a^2 = 2 \cdot 6$
 $a^2 = 60$ $a^2 = 12$
 $a = 2\sqrt{15}$ $a = 2\sqrt{3}$



$$6^2 = b \cdot 8$$

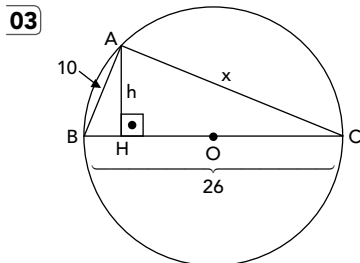
$$b = \frac{36}{8}$$

$$b = \frac{9}{2} \text{ cm}$$

$$a^2 = b^2 + 6^2$$

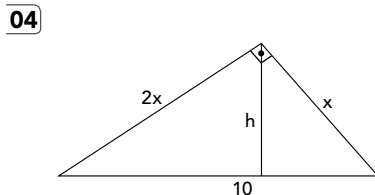
$$a^2 = \frac{81}{4} + 36$$

$$a^2 = \frac{225}{4} \therefore a = \frac{15}{2} \text{ cm}$$



I. $x^2 + 10^2 = 26^2$
 $x^2 = 676 - 100$
 $x^2 = 576$
 $x = 24 \text{ cm}$

II. $26 \cdot h = 10 \cdot 24$
 $h = \frac{240}{26} \therefore h = \frac{120}{13} \text{ cm}$



$$(2x)^2 + x^2 = 10^2$$

$$5x^2 = 100$$

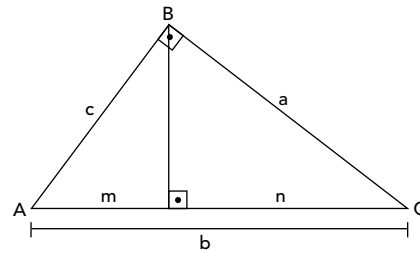
$$x^2 = 20$$

$$2x \cdot x = 10 \cdot h$$

$$2 \cdot 20 = 10h$$

$$h = 4$$

05



$$\frac{AB}{BC} = \frac{1}{2} = \frac{c}{a}$$

$$c^2 = m \cdot b$$

$$a^2 = n \cdot b$$

$$\frac{c^2}{a^2} = \frac{m}{n}$$

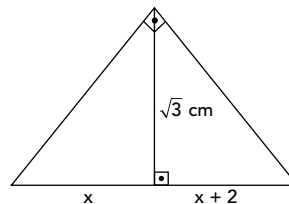
$$\left(\frac{c}{a}\right)^2 = \frac{m}{n}$$

$$\frac{m}{n} = \left(\frac{1}{2}\right)^2 = \frac{1}{4}$$



ATIVIDADES PROPOSTAS

01



$$x \cdot (x+2) = (\sqrt{3})^2$$

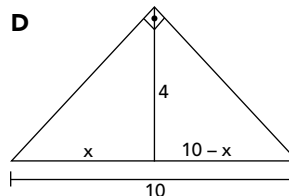
$$x^2 + 2x = 3$$

$$x^2 + 2x - 3 = 0$$

$$(x-1)(x+3) = 0 \therefore x = 1 \text{ cm}$$

Hipotenusa = $1+3 = 4 \text{ cm}$

02 D



$$x \cdot (10-x) = 16$$

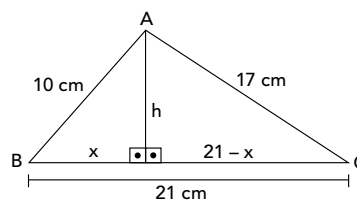
$$10x - x^2 - 16 = 0$$

$$x^2 - 10x + 16 = 0$$

$$(x-8) \cdot (x-2) = 0$$

$$x = 8 \text{ ou } x = 2$$

03



I. $x^2 + h^2 = 100$

II. $(21-x)^2 + h^2 = 17^2$
 $441 - 42x + x^2 + h^2 = 289$
 $441 - 42x + 100 = 289$
 $42x = 252$
 $x = 6 \text{ cm}$

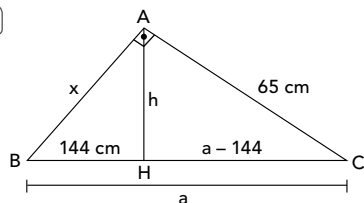
Substituindo x em I:

$$6^2 + h^2 = 100$$

$$h^2 = 64$$

$$h = 8 \text{ cm}$$

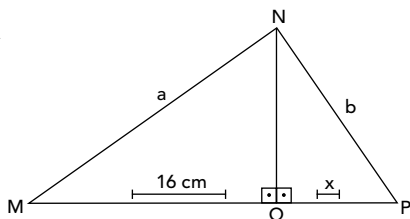
04



$$\begin{aligned} \text{I. } x^2 + 65^2 &= a^2 \\ \text{II. } x^2 &= 144a \\ \text{Logo: } 144a + 65^2 &= a^2 \\ a^2 - 144a - 4225 &= 0 \\ \Delta &= 37636 \Rightarrow a = 169 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Então: } x^2 &= 144 \cdot 169 \therefore \\ x &= \sqrt{144 \cdot 169} \\ x &= 12 \cdot 13 = 156 \\ x &= \overline{AB} = 156 \text{ cm} \end{aligned}$$

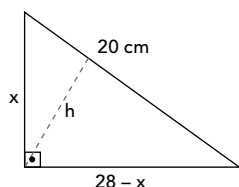
05 A



$$\begin{aligned} \frac{\overline{MN}}{\overline{NP}} &= \frac{a}{b} = \frac{4}{3} \\ a^2 &= 16 \cdot (16 + x) \\ b^2 &= x \cdot (16 + x) \end{aligned}$$

$$\begin{aligned} \frac{a^2}{b^2} &= \frac{16}{x} \\ \left(\frac{a}{b}\right)^2 &= \frac{16}{x} \\ \left(\frac{4}{3}\right)^2 &= \frac{16}{x} \\ \frac{16}{9} &= \frac{16}{x} \therefore x = 9 \text{ cm} \end{aligned}$$

06

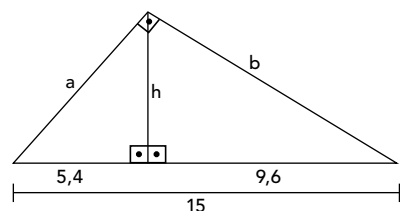


$$\begin{aligned} (28 - x)^2 + x^2 &= 20^2 \\ 784 - 56x + x^2 + x^2 &= 400 \\ 2x^2 - 56x + 384 &= 0 \quad (:2) \\ x^2 - 28x + 192 &= 0 \\ \Delta &= 16 \therefore x = \frac{28 \pm 4}{2} \end{aligned}$$

$$\begin{aligned} x' &= 16 \\ x'' &= 12 \end{aligned}$$

$$\begin{aligned} \text{Logo: } 20h &= 12 \cdot 16 \\ 20h &= 192 \\ h &= 9,6 \text{ cm} \end{aligned}$$

07



$$\begin{aligned} a^2 &= 5,4 \cdot 15 & b^2 &= 9,6 \cdot 15 & 2p &= 9 + 12 + 15 \\ a^2 &= 81 & b^2 &= 144 & 2p &= 36 \\ a &= 9 & b &= 12 \end{aligned}$$

Aula 8

Trigonometria no triângulo retângulo I



ATIVIDADES PARA SALA

$$\begin{aligned} \text{01 a) } \sin \alpha &= \frac{12}{13} & \text{d) } \sin \beta &= \frac{5}{13} \\ \text{b) } \cos \alpha &= \frac{5}{13} & \text{e) } \cos \beta &= \frac{12}{13} \\ \text{c) } \tan \alpha &= \frac{12}{5} & \text{f) } \tan \beta &= \frac{5}{12} \end{aligned}$$

$$\text{02 a) } \sin 30^\circ = \frac{x}{8} = \frac{1}{2} \therefore x = 4$$

$$\text{b) } \sin 60^\circ = \frac{x}{6} = \frac{\sqrt{3}}{2} \therefore x = 3\sqrt{3}$$

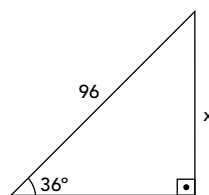
$$\text{03 } \sin \theta = \frac{4}{5} = \frac{8}{m} \therefore m = 10$$

$$n^2 + 8^2 = m^2$$

$$n^2 + 64 = 10^2$$

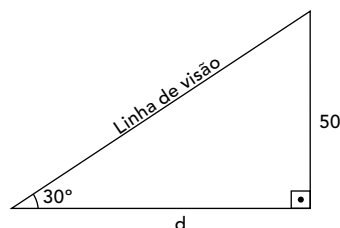
$$n^2 = 100 - 64 \therefore n^2 = 36 \therefore n = 6$$

04



$$\begin{aligned} \sin 36^\circ &= \frac{x}{96} = 0,588 \\ x &= 56,44 \text{ m} \end{aligned}$$

05



$$\tan 30^\circ = \frac{50}{d} = \frac{\sqrt{3}}{2}$$

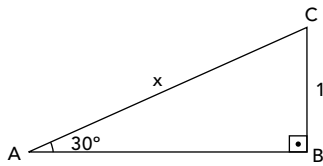
$$d = \frac{100\sqrt{3}}{3} \text{ m}$$



ATIVIDADES PROPOSTAS

05

01



$$x^2 = 1^2 + (\sqrt{3})^2 \Rightarrow$$

$$x^2 = 1 + 3$$

$$x^2 = 4$$

$$x = 2$$

$$\sin \hat{C} = \frac{\sqrt{3}}{2}$$

$$\cos \hat{C} = \frac{1}{2}$$

$$\tan \hat{C} = \frac{\sqrt{3}}{1} = \sqrt{3}$$

06

02

$$\overline{VD}^2 = (\sqrt{3} \cdot x)^2 + x^2$$

$$\overline{VD}^2 = 3x^2 + x^2$$

$$\overline{VD}^2 = 4x^2$$

$$\overline{VD} = 2x$$

$$\tan 30^\circ = \frac{x}{\sqrt{3}x} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\sin 60^\circ = \frac{\sqrt{3}x}{\overline{VD}} = \frac{\sqrt{3} \cdot x}{2x} = \frac{\sqrt{3}}{2}$$

$$\cos 30^\circ = \frac{\sqrt{3}x}{\overline{VD}} = \frac{\sqrt{3} \cdot x}{2x} = \frac{\sqrt{3}}{2}$$

07

03

$$a) \cos 60^\circ = \frac{x}{31,2} = \frac{1}{2}$$

$$x = 15,6$$

$$b) \tan x = \frac{7\sqrt{3}}{21} = \frac{\sqrt{3}}{3}$$

$$\text{Logo, } x = 30^\circ.$$

Aula 9

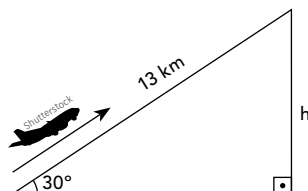
Trigonometria no triângulo retângulo II



ATIVIDADES PARA SALA

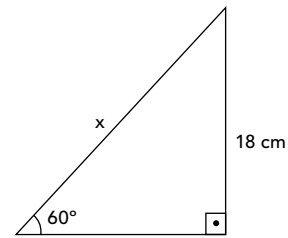
01

04



$$\sin 30^\circ = \frac{h}{13} = \frac{1}{2}$$

$$h = 6,5 \text{ km}$$

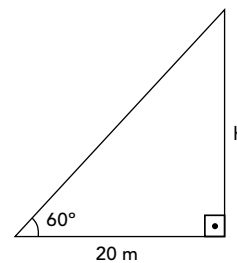


$$\sin 60^\circ = \frac{18}{x} = \frac{\sqrt{3}}{2} \Rightarrow x\sqrt{3} = 36 \Rightarrow x = \frac{36}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$x = \frac{36\sqrt{3}}{3} \Rightarrow x = 12\sqrt{3} \Rightarrow x = 12 \cdot 1,73$$

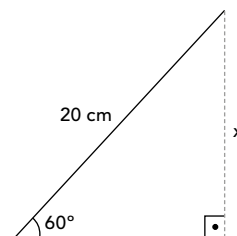
$$x = 20,76$$

Como há 5 cm da caneta para fora, o comprimento dela é 25,76 cm.



$$\tan 60^\circ = \frac{h}{20} = \sqrt{3}$$

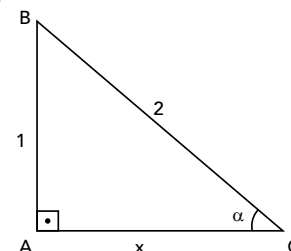
$$h = 20\sqrt{3} \text{ m}$$



$$\sin 60^\circ = \frac{x}{20} = \frac{\sqrt{3}}{2}$$

$$x = 10\sqrt{3} \text{ cm}$$

01



$$x^2 + 1^2 = 2^2$$

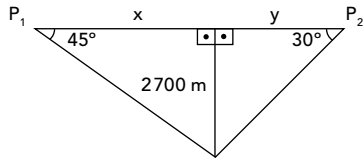
$$x^2 = 4 - 1$$

$$x^2 = 3$$

$$x = \sqrt{3}$$

$$\cos \alpha = \frac{x}{2} = \frac{\sqrt{3}}{2}$$

02



$$\operatorname{tg} 45^\circ = \frac{2700}{x} = 1$$

$$x = 2700 \text{ m}$$

$$\operatorname{tg} 30^\circ = \frac{2700}{y} = \frac{\sqrt{3}}{3}$$

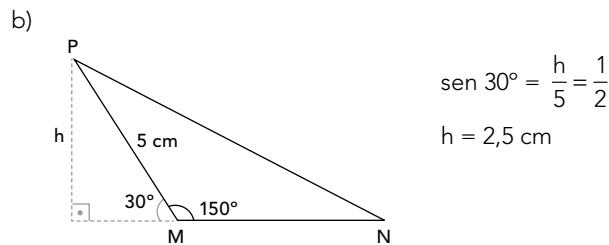
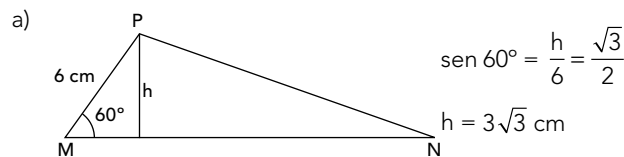
$$y\sqrt{3} = 8100$$

$$y = \frac{8100\sqrt{3}}{3}$$

$$y = 2700\sqrt{3} \text{ m}$$

$$\overline{P_1P_2} = x + y = 2700 + 2700\sqrt{3} = 2700(1 + \sqrt{3}) \text{ m}$$

03



04

a)

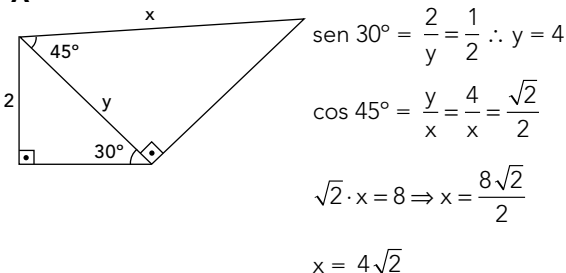
$$\left. \begin{aligned} \operatorname{sen} x &= \frac{9}{15} = \frac{3}{5} \\ \cos x &= \frac{12}{15} = \frac{4}{5} \end{aligned} \right\} \quad \operatorname{sen}^2 x + \cos^2 x = \left(\frac{3}{5}\right)^2 + \left(\frac{4}{5}\right)^2$$

$$\frac{9}{25} + \frac{16}{25} = \frac{25}{25} = 1$$

b)

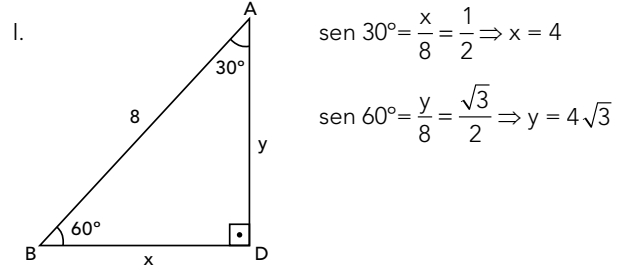
$$\operatorname{sen}(90^\circ - x) = \frac{12}{15} = \frac{4}{5} = \cos x$$

05

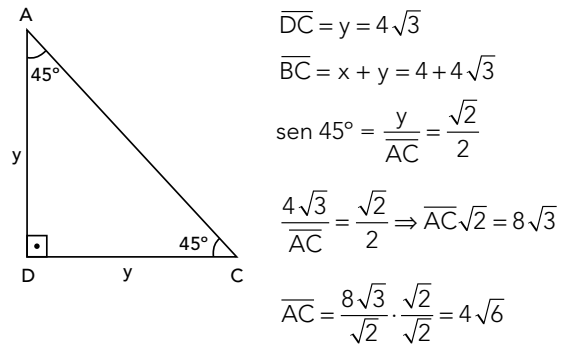


ATIVIDADES PROPOSTAS

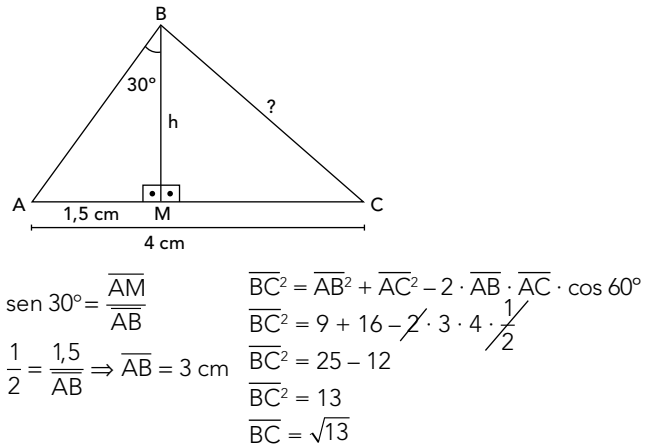
01



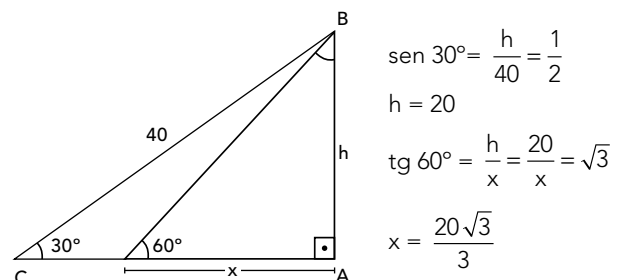
II.



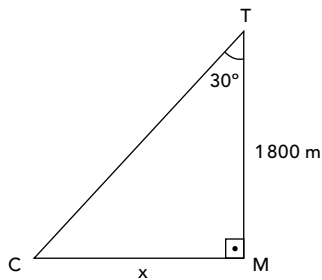
02



03



04



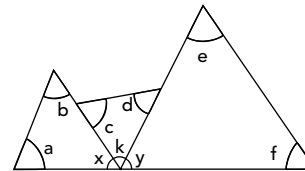
$$\operatorname{tg} 30^\circ = \frac{x}{1800} = \frac{\sqrt{3}}{3}$$

$$x = 600\sqrt{3} \text{ m}$$

03 B

Após observar a figura, tem-se: $\overline{AB} = \overline{BC}$.
Assim, o triângulo ABC é retângulo e isósceles.

04 D

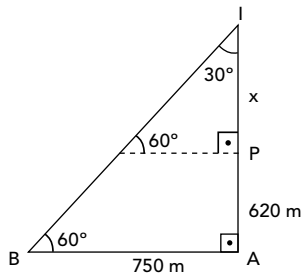


$$\begin{aligned} x + a + b &= 180^\circ \\ y + e + f &= 180^\circ \\ k + c + d &= 180^\circ \end{aligned}$$

$$\underbrace{(x + y + k)}_{180^\circ} + (a + b + c + d + e + f) = 540^\circ$$

$$\begin{aligned} a + b + c + d + e + f &= 540^\circ - 180^\circ \\ a + b + c + d + e + f &= 360^\circ \end{aligned}$$

05



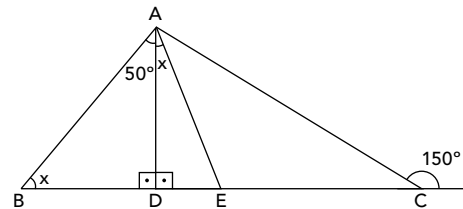
$$\operatorname{tg} 60^\circ = \frac{x + 620}{750} = \sqrt{3}$$

$$x + 620 = 750\sqrt{3}$$

$$x = 750\sqrt{3} - 620$$

$$x = 10(75\sqrt{3} - 62) \text{ m}$$

05



No $\triangle ABD$, tem-se:

$$x + 50^\circ + 90^\circ = 180^\circ$$

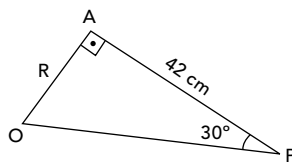
$$x = 40^\circ$$

Logo, no $\triangle AEB$, tem-se:

$$(50^\circ + x) + \hat{AEB} + 40^\circ = 180^\circ$$

$$\hat{AEB} = 50^\circ$$

06

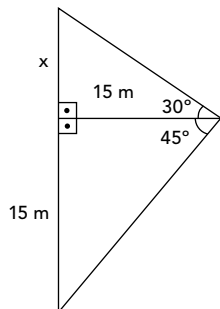


$$\operatorname{tg} 30^\circ = \frac{R}{42} = \frac{\sqrt{3}}{3}$$

$$R = 14\sqrt{3} \text{ cm}$$

$$\text{Logo, } D = 2 \cdot 14\sqrt{3} = 28\sqrt{3} \text{ cm}$$

07



$$\operatorname{tg} 30^\circ = \frac{x}{15} = \frac{\sqrt{3}}{3}$$

$$x = 5\sqrt{3}$$

Logo, a altura do prédio é:

$$x + 15 = 5\sqrt{3} + 15 = 5(\sqrt{3} + 3) \text{ m}$$

Aula 10

Triângulos I



ATIVIDADES PARA SALA

01 $\alpha = 90^\circ - 35^\circ = 55^\circ$

02 a) Por possuir ângulo reto, o triângulo é classificado como retângulo.

b) $x + 10^\circ + x = 110^\circ$

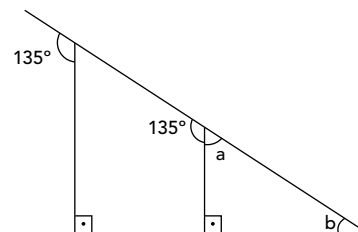
$$2x = 100^\circ$$

$$x = 50^\circ \text{ (Acutângulo)}$$



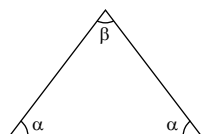
ATIVIDADES PROPOSTAS

01



$$a = b = 45^\circ$$

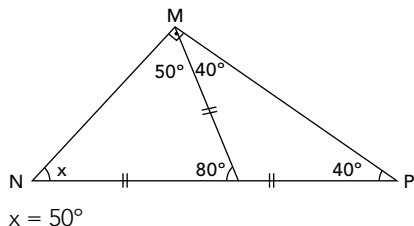
02



$$\begin{aligned}\alpha + \alpha &= 5\beta \\ 2\alpha &= 150^\circ \\ \alpha &= 75^\circ \\ \alpha + \alpha + \beta &= 180^\circ \\ 5\beta + \beta &= 180^\circ \\ 6\beta &= 180^\circ \\ \beta &= 30^\circ\end{aligned}$$

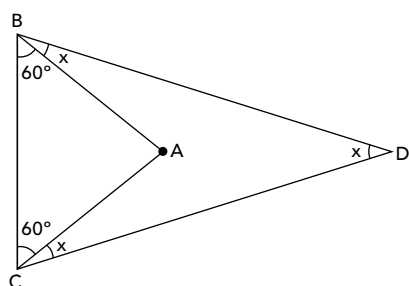
Os ângulos internos do triângulo são: 75° , 75° e 30° .

03 a)



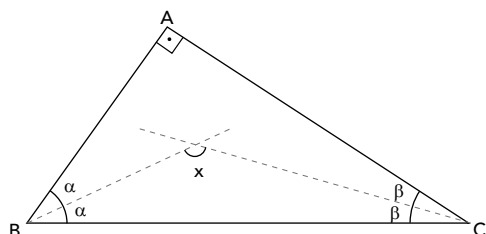
$$x = 50^\circ$$

b)



$$\begin{aligned}3x + 120 &= 180^\circ \\ 3x &= 60^\circ \\ x &= 20^\circ\end{aligned}$$

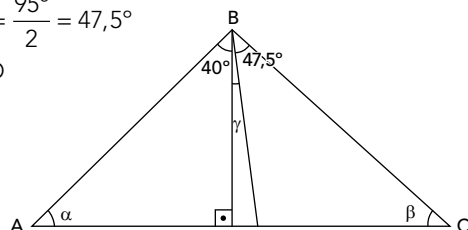
c)



$$\begin{aligned}2\alpha + 2\beta &= 90^\circ \\ \alpha + \beta &= 45^\circ \\ x + \alpha + \beta &= 180^\circ \\ x + 45^\circ &= 180^\circ \\ x &= 135^\circ\end{aligned}$$

04

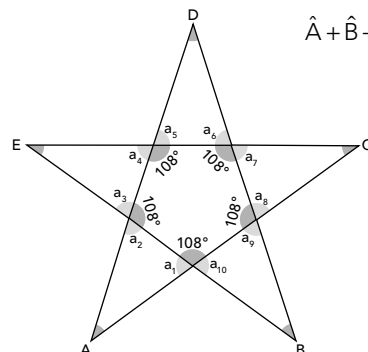
$$\begin{aligned}\hat{A}\hat{B}\hat{C} &= 95^\circ \\ \hat{A}\hat{B}\hat{D} = \hat{D}\hat{B}\hat{C} &= \frac{95^\circ}{2} = 47,5^\circ \\ 40^\circ + \gamma &= \hat{A}\hat{B}\hat{D} \\ 40^\circ + \gamma &= 47,5^\circ \\ \gamma &= 7,5^\circ\end{aligned}$$



05

$$\begin{aligned}\alpha + 40^\circ + 40^\circ &= 100^\circ \\ \alpha &= 20^\circ \\ \hat{C}\hat{A}\hat{D} &= 20^\circ\end{aligned}$$

06



$$\hat{A} + \hat{B} + \hat{C} + \hat{D} + \hat{E} = 180^\circ$$

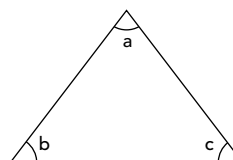
Considerando que o pentágono formado pela figura é regular, então, pela propriedade da soma dos ângulos internos dos polígonos regulares, cada ângulo interno desse pentágono mede:

$$S = \frac{(n-2) \cdot 180^\circ}{n} = \frac{(5-2) \cdot 180}{5} = \frac{3 \cdot 180}{5} = 108^\circ$$

Assim, os ângulos agudos formados pelas pontas medirão $180^\circ - 2 \cdot 72^\circ = 36^\circ$.

Logo, $\hat{A} + \hat{B} + \hat{C} + \hat{D} + \hat{E} = 36 + 36 + 36 + 36 + 36 = 5 \cdot 36 = 180^\circ$.

07 E



$$\frac{b+c}{2} = 50 \therefore b+c = 100^\circ$$

$$\frac{b+a}{2} = 50 \therefore b+a = 100^\circ$$

$$a = 20^\circ; b = 80^\circ; c = 80^\circ$$

Aula 11

Triângulos II



ATIVIDADES PARA SALA

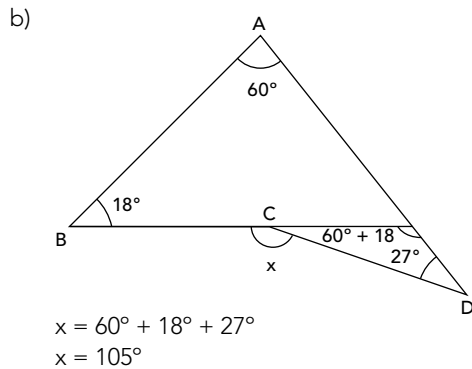
01

$$\begin{aligned}x + (x + 7) + (x + 4) &= 68 \\ 3x + 11 &= 68 \\ 3x &= 68 - 11 \\ 3x &= 57 \\ x &= 19 \\ \text{Portanto, o menor lado mede } 19 \text{ cm.}\end{aligned}$$

02

$$\begin{aligned}39 - 17 < x < 39 + 17 \\ 22 < x < 56 \\ \text{Logo, se o triângulo é isósceles, a medida do terceiro lado é } 39 \text{ cm.}\end{aligned}$$

03 a) $2x + 10^\circ + x + 10^\circ + 2x - 30^\circ = 180^\circ$
 $5x - 10^\circ = 180^\circ$
 $5x = 190^\circ$
 $x = 38^\circ$



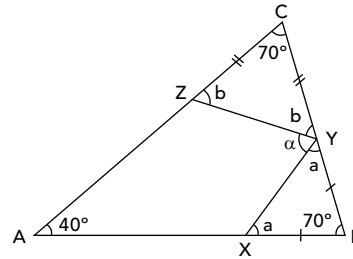
c) $2x = x + 5^\circ + 62^\circ$
 $2x - x = 67^\circ$
 $x = 67^\circ$

04 C
 $4 - 3 < x < 4 + 3$
 $1 < x < 7$

05 $3y - 12 = 2x + y$ $3x + 1 = x + y$
 $2y - 2x = 12$ $2x - y = -1$
 $y - x = 6$
 $\begin{cases} y - x = 6 \\ -y + 2x = -1 \end{cases}$
 $x = 5 \therefore y = 11$

$\overline{CD} = 4x + y + 1$
 $\overline{CD} = 20 + 11 + 1$
 $\overline{CD} = 32$

02 D



$2b + 70^\circ = 180^\circ$
 $2b = 110^\circ$
 $b = 55^\circ$
 $a = b = 55^\circ$
 $\alpha + a + b = 180^\circ$
 $\alpha + 110 = 180^\circ$
 $\alpha = 70^\circ$

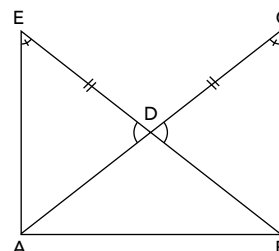
03 $21 - 8 < x < 21 + 8$
 $13 < x < 29$

Se x é o maior múltiplo de 8 do intervalo, logo, vale 24.

04 $3y + 14 = 2(y + 9)$
 $3y - 2y = 18 - 14$
 $y = 4$

$2x + 3 = x + 5$
 $x = 2$
 $2p = 14 + 16 + 26 = 56$

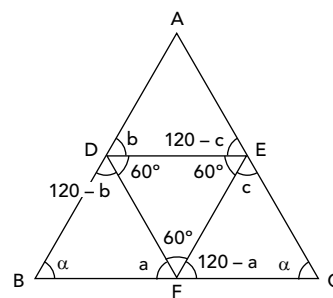
05



$\widehat{E\hat{D}A} \cong \widehat{C\hat{D}B}$ (O.P.V.)
 $\hat{E} \cong \hat{C}$ (Por definição)
 $\overline{ED} \cong \overline{CD}$ (Por definição)
 $A.L.A. \Rightarrow \triangle AED \cong \triangle BCD$
 $E\hat{A}B = C\hat{B}D$ (c.q.d.)

06 a) $x = 10^\circ$
b) $x = 65^\circ$

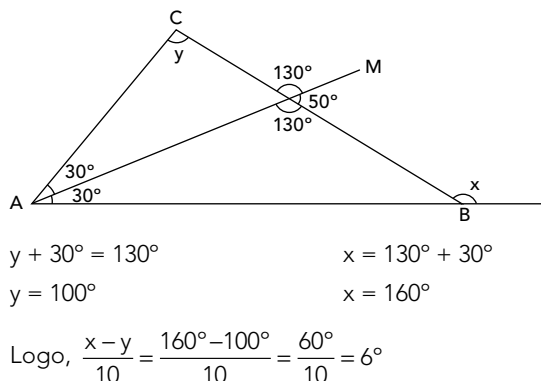
07 E



$120^\circ - a + c + \alpha = 180^\circ$
 $\alpha = 60^\circ + a - c$
 $120^\circ - b + a + \alpha = 180^\circ$
 $\alpha = 60^\circ + b - a$
 $60^\circ + a - c = 60^\circ + b - a$
 $2a = b + c$
 $a = \frac{b+c}{2}$

ATIVIDADES PROPOSTAS

01

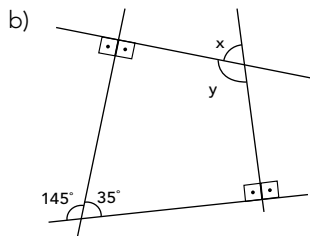


Aula 12

Quadriláteros I

ATIVIDADES PARA SALA

01 a) $2x + 4x + 3x + x = 360^\circ$
 $10x = 360^\circ$
 $x = 36^\circ$



$y + 35^\circ = 180^\circ$
 $y = 145^\circ$
 $x = 35^\circ$

c) $x + \alpha + \beta = 180^\circ$
 $\alpha + \beta = 180^\circ - x$
 $133^\circ + 87^\circ + 2\alpha + 2\beta = 360^\circ$
 $220^\circ + 2(180^\circ - x) = 360^\circ$
 $220^\circ + 360^\circ - 2x = 360^\circ$
 $2x = 220^\circ$
 $x = 110^\circ$

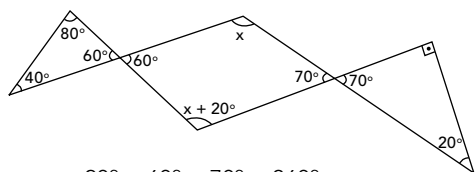
d) $m = 100^\circ$
 $2m - x = 50^\circ$
 $200 - x = 50^\circ$
 $x = 150^\circ$

02 C

- a) (F) Ambos possuem todos os ângulos retos.
 b) (F) Ambos são quadriláteros.
 c) (V)
 d) (F) Somente o quadrado possui os lados congruentes.

03 $40 + 40 + 27 + 25 = 132$ m
 Portanto, Abel gastará 132 m de tela.

04



$x + x + 20^\circ + 60^\circ + 70^\circ = 360^\circ$
 $2x = 360^\circ - 150^\circ$
 $2x = 210^\circ$
 $x = 105^\circ$

05 a) $3x - 10^\circ = x + 50^\circ$
 $2x = 60^\circ \therefore x = 30^\circ$
 $y + 3x - 10^\circ = 180^\circ$
 $y + 90^\circ - 10^\circ = 180^\circ \therefore y = 100^\circ$

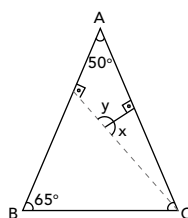
b) $2x + 20^\circ = x + 80^\circ \therefore x = 60^\circ$
 $y + x + 80^\circ = 180^\circ$
 $y + 60^\circ + 80^\circ = 180^\circ \therefore y = 40^\circ$

ATIVIDADES PROPOSTAS

01 a) $5x = 360^\circ$
 $x = 72^\circ$
 $\hat{F} = 2 \cdot 72^\circ - 30^\circ$
 $\hat{F} = 114^\circ$

b) $\hat{F} = 90^\circ + 70^\circ + 130^\circ = 360^\circ$
 $\hat{F} + 290^\circ = 360^\circ$
 $\hat{F} = 70^\circ$

02



$y + 50^\circ = 180^\circ$
 $y = 130^\circ$
 $\hat{x} = 50^\circ$

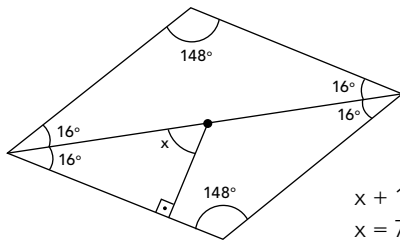
03 C

	a	b	c	d	e
Retângulo	✓	×	×	✓	✓
Losango	×	✓	×	✓	✓
Quadrado	✓	✓	✓	✓	✓

04 $3x = 18$
 $x = 6$
 $2y + 1 = 17$
 $2y = 16$
 $y = 8$

05 $x + 110^\circ + 2x - 13^\circ = 180^\circ$
 $3x = 83^\circ$
 $x = 27^\circ 40'$
 $\hat{A} = \hat{C} = 137^\circ 40'$
 $\hat{B} = \hat{D} = 42^\circ 20'$

06 a)



$$\begin{aligned}x + 16^\circ &= 90^\circ \\x &= 74^\circ\end{aligned}$$

b) $2a + 75^\circ + 2a + 30^\circ = 180^\circ$

$$4a + 105^\circ = 180$$

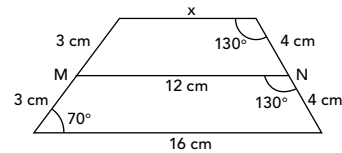
$$4a = 75^\circ$$

$$a = 18^\circ 45'$$

$$x = 2a + 75^\circ \therefore x = 37^\circ 30' + 75$$

$$x = 112^\circ 30'$$

03



$$\frac{x+16}{2} = 12$$

$$x = 24 - 16$$

$$x = 8 \text{ cm}$$

$$2p = 6 + 8 + 8 + 16 = 38 \text{ cm}$$

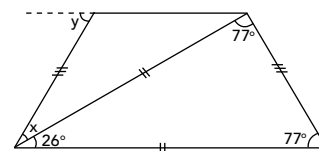
04

$$x + 2y = \frac{10 + 28}{2}$$

$$x + 2y = 19 \quad (\cdot 3)$$

$$3x + 6y = 57$$

05



$$x + 26^\circ = 77^\circ$$

$$x = 51^\circ$$

$$y = 77^\circ$$

Aula 13

Quadriláteros II

ATIVIDADES PARA SALA

01 a) $3x + 1 + 5 - x = 10$

$$2x + 6 = 10$$

$$2x = 4$$

$$x = 2$$

Portanto, os lados do retângulo são 3 e 7.

b) $2x - 9 = 21$

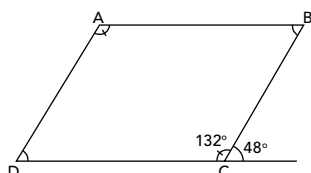
$$2x = 30$$

$$x = 15$$

$$2p = 2 \cdot 15 + 2 \cdot 21$$

$$2p = 72$$

02 a)



$$\hat{A} = 132^\circ$$

b) $3x + 191^\circ = 360^\circ$

$$3x = 169^\circ$$

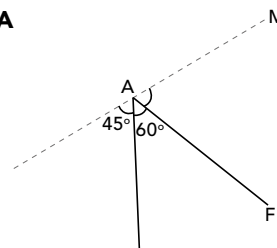
$$x = 56^\circ 20'$$

$$2x = 112^\circ 40'$$

$$\hat{A} = 112^\circ 40'$$

ATIVIDADES PROPOSTAS

01 A

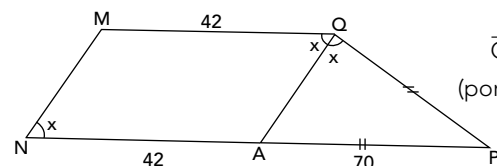


$$\hat{F\hat{A}M} + 45^\circ + 60^\circ = 180^\circ$$

$$\hat{F\hat{A}M} = 180^\circ - 105^\circ$$

$$\hat{F\hat{A}M} = 75^\circ$$

02 E



$\overline{QA} \parallel \overline{MN}$
(por construção)

MQAN é um paralelogramo.

$$\overline{MQ} = \overline{NA} = 42 \Rightarrow \overline{AP} = \overline{PQ} = 70 \text{ cm}$$

03

$$2x + 39^\circ + x = 90^\circ$$

$$3x = 51^\circ$$

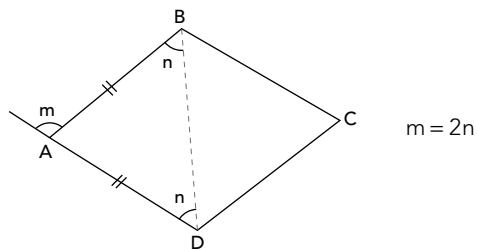
$$x = 17^\circ$$

$$x = 2y$$

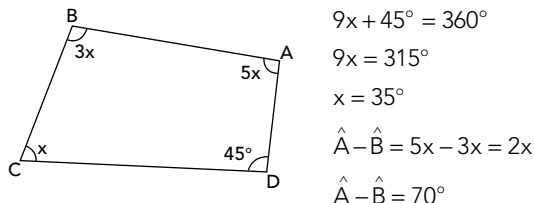
$$2y = 17^\circ$$

$$y = 8^\circ 30'$$

04

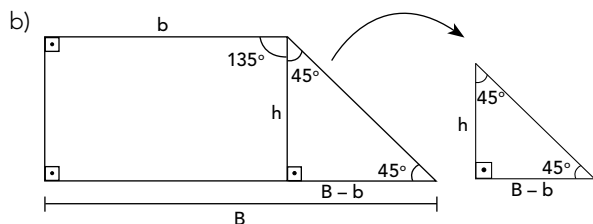


05 C



06 $2x + 3 + x + 9 = 4x + 5x$
 $3x + 12 = 9x$
 $6x = 12$
 $x = 2$
 $2p = 7 + 11 + 8 + 10$
 $2p = 36$

07 a) $\alpha + 123^\circ = 180^\circ$
 $\alpha = 57^\circ$



Triângulo retângulo isósceles, logo, $h = B - b$.

02 B

$$\frac{8 : 2}{18 : 2} = \frac{4}{9}$$

03 Jardineiras = $2 \cdot \frac{1 \cdot 3}{2} = 3 \text{ m}^2$

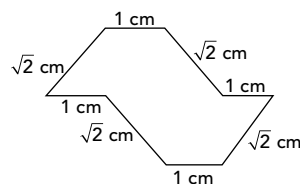
Piso = $4 \cdot 3 = 12 \text{ m}^2$

$A_{\text{cerâmica}} = 12 - 3 = 9 \text{ m}^2$

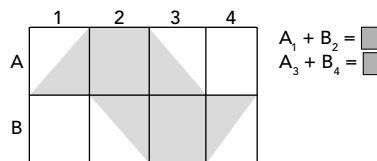
04 C

$x \cdot (10 + x) = 600$
 $x^2 + 10 - 600 = 0$
 $(x + 30) \cdot (x - 20) = 0$
 $x = 20$

05



$2p_{\text{Região sombreada}} = 4\sqrt{2} + 4$
 $= 4(\sqrt{2} + 1) \text{ cm}$



Logo:
 $(A_1 + B_2) + A_2 + B_3 + (A_3 + B_4) = 4$
 $A = 4 \cdot 1^2 = 4 \cdot 1 = 4$

Portanto, o perímetro e a área da figura apresentada valem, respectivamente, $4(\sqrt{2} + 1) \text{ cm}$ e 4 cm^2 .

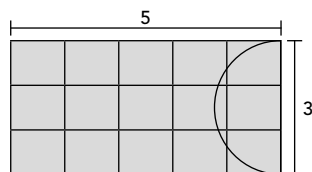
Aula 14

Áreas das figuras planas I

ATIVIDADES PARA SALA

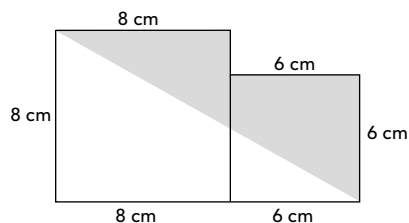
01 C

Deslocando o semicírculo que está na área superior da imagem para a lateral, obtém-se um retângulo como o que se vê a seguir.



Logo, a área da região sombreada pode ser obtida pela multiplicação dos lados do retângulo.
 $A = 5 \cdot 3 = 15$

01 A

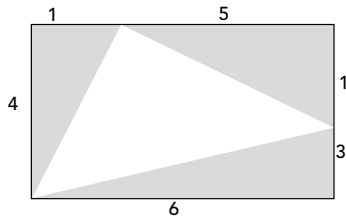


$A_{\text{total}} = \frac{8 \cdot 14}{2} = 8 \cdot 7 = 56 \text{ cm}^2$

$A_{\text{total}} = 6^2 + 8^2 = 36 + 64 = 100 \text{ cm}^2$

$A_{\text{sombreada}} = 100 - 56 = 44 \text{ cm}^2$

02



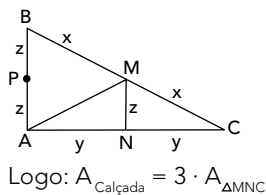
$$A_{\text{sombreada}} = \frac{4 \cdot 1}{2} + \frac{5 \cdot 1}{2} + \frac{6 \cdot 3}{2}$$

$$A = \frac{4 + 5 + 18}{2} = \frac{27}{2} = 13,5$$

$$A_R = 6 \cdot 4 = 24$$

$$A_{\Delta ABC} = 24 - 13,5 = 10,5$$

03 E



$$A_{\Delta ABC} = \frac{2z \cdot 2y}{2} = 2yz$$

$$A_{\Delta MNC} = \frac{y \cdot z}{2}$$

$$A_{\text{Calçada}} = 2yz - \frac{yz}{2} = \frac{3yz}{2}$$

Logo: $A_{\text{Calçada}} = 3 \cdot A_{\Delta MNC}$

04 A

$$1995 \Rightarrow \frac{30000}{1500} = 20 \text{ ha}$$

$$1996 \Rightarrow \frac{40000}{2500} = 16 \text{ ha}$$

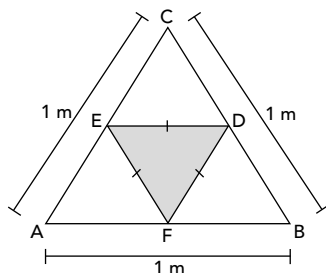
$$1997 \Rightarrow \frac{50000}{2500} = 20 \text{ ha}$$

$$1998 \Rightarrow \frac{60000}{2500} = 24 \text{ ha}$$

$$1999 \Rightarrow \frac{80000}{4000} = 20 \text{ ha}$$

De 1995 para 1996, o gráfico deve decrescer. Assim, o gráfico adequado é o representado na alternativa A.

05 B

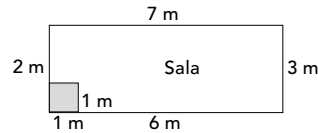


$$A_{\Delta \text{total}} = \frac{\ell^2 \sqrt{3}}{4} = \frac{\sqrt{3}}{4}$$

$$A_{\Delta \text{menor}} = \frac{\left(\frac{1}{2}\right)^2 \cdot \sqrt{3}}{4} = \frac{\sqrt{3}}{16}$$

$$A_{\Delta} = \frac{\sqrt{3}}{4} - 3 \cdot \frac{\sqrt{3}}{16} = \frac{4\sqrt{3} - 3\sqrt{3}}{16} = \frac{\sqrt{3}}{16}$$

06 D

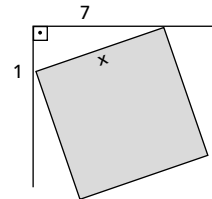


$$A_{\text{Total}} = 7 \cdot 3 = 21 \text{ m}^2$$

$$A_{\square} = 1 \text{ m}^2$$

$$A_{\text{Sala}} = 21 - 1 = 20 \text{ m}^2$$

07 D



$$x^2 = 50$$

$$x = \sqrt{50}$$

$$A_{\square} = (\sqrt{50})^2$$

$$A_{\square} = 50$$

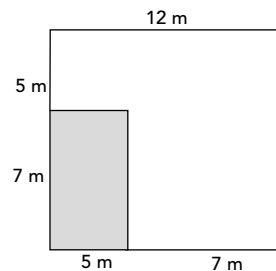
Aula 15

Áreas das figuras planas II



ATIVIDADES PARA SALA

01 B

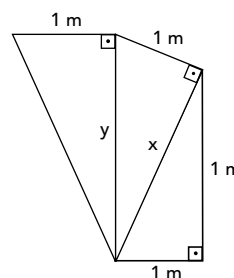


$$A_{\text{Total}} = 12^2 = 144 \text{ m}^2$$

$$A_{\square} = 7 \cdot 5 = 35 \text{ m}^2$$

$$A_{\text{Restante}} = 144 - 35 = 109 \text{ m}^2$$

02 a)



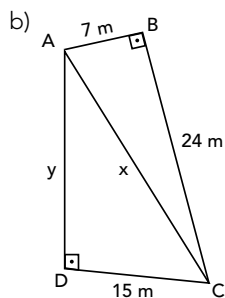
$$x^2 = 2 \therefore x = \sqrt{2}$$

$$y^2 = 1^2 + x^2$$

$$y^2 = 1 + 2 \therefore y = \sqrt{3}$$

$$A_{\text{Total}} = \frac{11}{2} + \frac{1 \cdot \sqrt{2}}{2} + \frac{1 \cdot \sqrt{3}}{2}$$

$$A_{\text{Total}} = \frac{1 + \sqrt{2} + \sqrt{3}}{2} \text{ m}^2$$



$$\begin{aligned}x^2 &= 7^2 + 24^2 \\x^2 &= 49 + 576 \\x^2 &= 625 \\x &= 25 \text{ m} \\625 &= y^2 + 15^2 \\y^2 &= 625 - 225 \\y^2 &= 400 \therefore y = 20 \text{ m}\end{aligned}$$

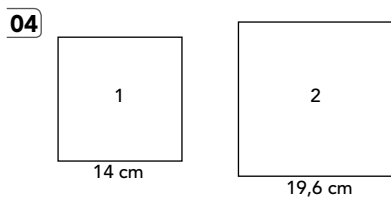
$$A_{\text{Total}} = \frac{7 \cdot 24}{2} + \frac{15 \cdot 20}{2}$$

$$A_{\text{Total}} = \frac{168 + 300}{2} \Rightarrow A_{\text{Total}} = 234 \text{ m}^2$$

03 $x^2 - 10x + 21 = 0$
 $(x - 3) \cdot (x - 7) = 0$
 $x = 7; x = 3$

$2p = 20$

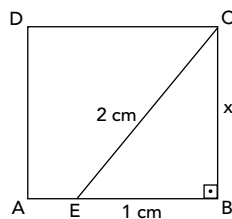
$A_{\square} = 25$



$$\begin{aligned}A_1 &= 14^2 = 196 \text{ cm}^2 \\A_2 &= (19,6)^2 = 384,16 \text{ cm}^2 \\384,16 - 196 &= 188,16 \\\frac{188,16}{196} &= 0,96 = 96\%\end{aligned}$$

Portanto, a área do novo quadrado aumentará 96% em relação à área do primeiro quadrado.

05 A



$$\begin{aligned}x^2 + 1^2 &= 4 \\x^2 &= 3 \\x &= \sqrt{3} \\A_{\square} &= (\sqrt{3})^2 = 3\end{aligned}$$

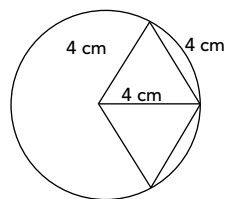


ATIVIDADES PROPOSTAS

01 I. B

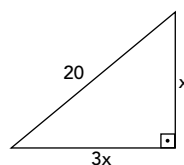
$$A_{\triangle ABC} = \frac{4 \cdot 6}{2} = 12$$

II. D



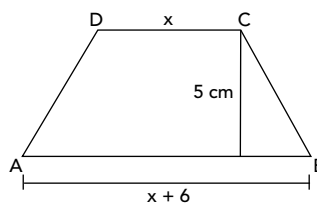
$$\begin{aligned}A &= \frac{4^2 \sqrt{3}}{4} \cdot 2 \\A &= 8\sqrt{3} \text{ cm}^2\end{aligned}$$

02



$$\begin{aligned}(3x)^2 + x^2 &= 20^2 \\10x^2 &= 400 \\x^2 &= 40 \\A_{\text{Losango}} &= \frac{D \cdot d}{2} \\A_{\text{Losango}} &= \frac{6x \cdot 2x}{2} \\A_{\text{Losango}} &= 6x^2 \\A_{\text{Losango}} &= 240 \text{ cm}^2\end{aligned}$$

03

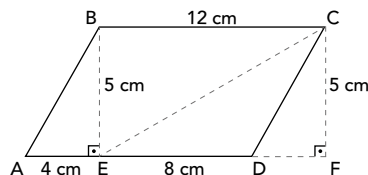


$$\begin{aligned}A &= \frac{(x + x + 6) \cdot 5}{2} = 35 \\(2x + 6) \cdot 5 &= 70 \\2x + 6 &= 14 \\2x &= 8 \therefore x &= 4 \\\overline{AB} &= x + 6 = 4 + 6 = 10 \text{ cm}\end{aligned}$$

04

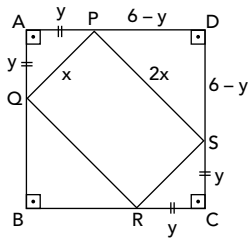
$$\begin{aligned}16 \text{ km} &= 16000 \text{ m} \\A_{\text{Estrada}} &= 16000 \cdot 16 \\A_{\text{Estrada}} &= 256000 \text{ m}^2 \\256000 \cdot 300 &= 76800000 = 76,8 \text{ milhões}\end{aligned}$$

05 B



$$\begin{aligned}A_{\triangle EDC} &= A_{\triangle EFC} - A_{\triangle DFC} \\A_{\triangle EDC} &= \frac{12 \cdot 5}{2} - \frac{4 \cdot 5}{2} = 30 - 10 = 20 \text{ cm}^2\end{aligned}$$

06 C



$$\begin{aligned}x^2 &= 2y^2 \\(2x)^2 &= 2 \cdot (6-y)^2 \\4x^2 &= 2(36-12y+y^2) \\2x^2 &= 36-12y+y^2 \\4y^2-y^2+12y-36 &= 0 \\3y^2+12y-36 &= 0 \\y^2+4y-12 &= 0 \\(y+6) \cdot (y-2) &= 0 \\y &= 2\end{aligned}$$

$$\begin{aligned}x^2 &= 2 \cdot 2^2 \\x^2 &= 8 \\A &= 2x \cdot x \\A &= 2 \cdot x^2 \\A &= 16 \text{ cm}^2\end{aligned}$$

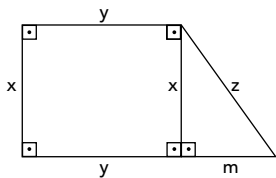
02

$$\begin{aligned}A &= \frac{(52+38) \cdot 40}{2} \\A &= 90 \cdot 20 = 1800 \text{ m}^2 \\Valor &= 1800 \cdot 280 \\Valor &= \text{R\$ } 504\,000,00\end{aligned}$$

03

$$\begin{aligned}A_{\text{Total}} &= 210 \cdot 95 = 19950 \text{ m}^2 \\A_{\text{Trapézio}} &= \frac{(80+38) \cdot 70}{2} = 118 \cdot 35 = 4130 \text{ m}^2 \\A_{\triangle} &= \frac{15 \cdot 28}{2} = \frac{420}{2} = 210 \text{ m}^2 \\A_{\text{Hachurada}} &= A_{\text{Total}} - A_{\text{Trapézio}} - A_{\triangle} \\A_{\text{Hachurada}} &= 19950 - 4130 - 210 \\A_{\text{Hachurada}} &= 15610 \text{ m}^2\end{aligned}$$

07 A



$$\begin{aligned}z^2 &= x^2 + m^2 \\m^2 &= z^2 - x^2 \\m &= \sqrt{z^2 - x^2}\end{aligned}$$

$$\begin{aligned}A &= \frac{(y+m+y) \cdot x}{2} \\A &= \frac{x \cdot (2y + \sqrt{z^2 - x^2})}{2} \\A &= x \cdot \left(y + \frac{1}{2} \sqrt{z^2 - x^2} \right)\end{aligned}$$

04 B

$$\begin{aligned}A_I &= \frac{a \cdot b}{2} \\A_{II} &= \frac{\frac{2}{3}a \cdot b}{2} = \frac{2}{3} \cdot a \cdot b \cdot \frac{1}{2} = \frac{ab}{3} \\A_{III} &= \frac{\frac{a}{3} \cdot b}{2} = \frac{a}{3} \cdot b \cdot \frac{1}{2} = \frac{ab}{6} \\A_{II} + A_{III} &= \frac{ab}{3} + \frac{ab}{6} = \frac{2ab+ab}{6} = \frac{3ab}{6} = \frac{ab}{2}\end{aligned}$$

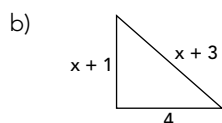
Aula 16

Áreas das figuras planas III



ATIVIDADES PARA SALA

01 a) $b^2 + 15^2 = 17^2$
 $b^2 = 289 - 225$
 $b^2 = 64 \therefore b = 8 \text{ cm}$
 $A = \frac{15 \cdot 8}{2} = 60 \text{ cm}^2$



$$\begin{aligned}A &= \frac{(2+6) \cdot 3}{2} \\A &= 12\end{aligned}$$

$$\begin{aligned}x^2 + 6x + 9 &= x^2 + 2x + 1 + 16 \\4x &= 17 - 9 \\4x &= 8 \\x &= 2 \text{ cm}\end{aligned}$$

05 C

$$\begin{aligned}\frac{x}{y} &= \frac{5}{8} \therefore x = \frac{5y}{8} \\x \cdot y &= 1000 \\ \frac{5y}{8} \cdot y &= 1000 \\5y^2 &= 8000 \\y^2 &= 1600 \\y &= 40 \text{ m} \\x &= \frac{5 \cdot 40}{8} \\x &= 5 \cdot 5 \\x &= 25 \text{ m}\end{aligned}$$



ATIVIDADES PROPOSTAS

01 B

$$\begin{aligned}\text{I. } \frac{h-x}{h} &= \frac{c}{b} \\hc &= b(h-x) \\c &= \frac{b(h-x)}{h} \\ \text{II. } A &= c \cdot x \\A &= \frac{b(h-x)}{h} \cdot x \\A &= \frac{bx(h-x)}{h}\end{aligned}$$

02 C

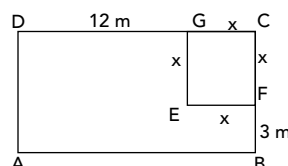
$$\begin{aligned} A_1 &= 55 \cdot 45 = 2475 \text{ m}^2 \Rightarrow \text{Perímetro}_1 = 200 \text{ m} \\ A_2 &= 55 \cdot 55 = 3025 \text{ m}^2 \Rightarrow \text{Perímetro}_2 = 220 \text{ m} \\ A_3 &= 60 \cdot 30 = 1800 \text{ m}^2 \Rightarrow \text{Perímetro}_3 = 180 \text{ m} \\ A_4 &= 70 \cdot 20 = 1400 \text{ m}^2 \Rightarrow \text{Perímetro}_4 = 180 \text{ m} \\ A_5 &= 95 \cdot 85 = 8075 \text{ m}^2 \Rightarrow \text{Perímetro}_5 = 360 \text{ m} \end{aligned}$$

Portanto, o terreno que atende às restrições apresentadas pela prefeitura e tem maior área é o terreno 3.

03 E

$$\begin{aligned} (5-x)(3-y) &= 15 - 5y - 3x + xy \\ A_{\text{Perdida}} &= 15 - (15 - 5y - 3x + xy) \\ A_{\text{Perdida}} &= 5y + 3x - xy \end{aligned}$$

04 C



$$\begin{aligned} (x+12) \cdot (x+3) &= 190 \\ x^2 + 15x + 36 &= 190 \\ x^2 + 15x - 154 &= 0 \\ (x+22)(x-7) &= 0 \therefore x = 7 \end{aligned}$$

05 A

$$\begin{aligned} (2x+2) \cdot (2x+3) &= 12 \\ 4x^2 + 6x + 4x + 6 &= 12 \\ 4x^2 + 10x - 6 &= 0 \\ 2x^2 + 5x - 3 &= 0 \\ \Delta &= 25 + 24 = 49 \\ x &= \frac{-5 \pm 7}{4} \begin{cases} x' = \frac{1}{2} = 0,5 \\ x'' = -3 \notin \mathbb{N} \end{cases} \\ x &= 0,5 \text{ m} \end{aligned}$$

$$\begin{cases} x^2 + y^2 = 218 & \text{(I)} \\ x + y = 20 \therefore x = 20 - y & \text{(II)} \end{cases}$$

Substituindo II em I:

$$\begin{aligned} (20-y)^2 + y^2 &= 218 & x &= 20 - 7 \\ 400 - 40y + y^2 + y^2 &= 218 & x &= 13 \\ 2y^2 - 40y &= -182 \\ y^2 - 20y + 91 &= 0 \\ (y-7) \cdot (y-13) &\therefore y = 7 \end{aligned}$$

$$\begin{aligned} 07 \quad A &= 10 \cdot 50 = 500 \cdot 2 = 1000 \\ A &= 10 \cdot 30 = 300 \cdot 2 = 600 \\ A &= 30 \cdot 50 = 1500 \cdot 2 = 3000 \end{aligned}$$

$$1000 + 600 + 3000 = 4600 \cdot 5000 = 23000000 \text{ cm}^2$$

Serão utilizados 2300 m² de papelão.

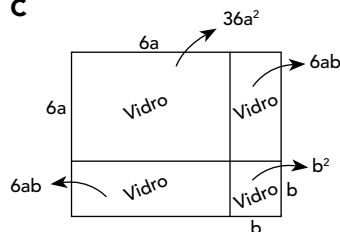
Aula 17

Áreas das figuras planas IV



ATIVIDADES PARA SALA

01 C



$$A_{\text{Total}} = 36a^2 + 12ab + b^2 = (6a + b)^2$$

02

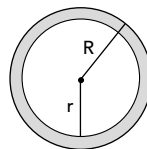
$$\begin{aligned} A_{\text{Banheiro}} &= 5 \text{ m}^2 = 50000 \text{ cm}^2 \\ A_{\text{Cerâmica}} &= (20 \text{ cm})^2 = 400 \text{ cm}^2 \end{aligned}$$

$$\text{Cerâmicas necessárias} = \frac{50000 \text{ cm}^2}{400 \text{ cm}^2} = 125$$

03

$$A = \pi r^2 = (6\sqrt{3})^2 \cdot \pi = 36 \cdot 3 \cdot \pi = 108\pi \text{ m}^2$$

04



$$\begin{aligned} R &= 2,7 : 2 = 1,35 \text{ cm} \therefore A = R^2 \cdot \pi \\ r &= 1,8 : 2 = 0,9 \text{ cm} \therefore A = r^2 \cdot \pi \\ A_{\text{região dourada}} &= (1,35)^2 \cdot \pi - (0,9)^2 \pi \\ A_{\text{região dourada}} &= (1,8225 - 0,81) \pi \\ A_{\text{região dourada}} &= 1,0125\pi \text{ cm}^2 \end{aligned}$$

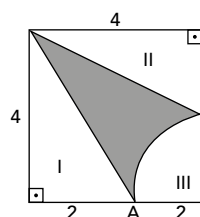
05

$$D = 180 : 4 = 45 \therefore R = 22,5 \therefore A = (22,5)^2 \cdot \pi = 506,25\pi \text{ cm}^2$$



ATIVIDADES PROPOSTAS

01



$$A_I = A_{II} = \frac{4 \cdot 2}{2} = 4 \text{ cm}^2$$

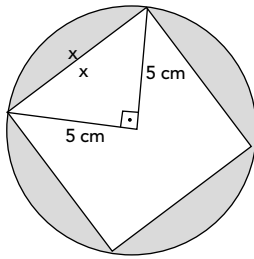
$$A_{III} = \frac{1}{4} \cdot \pi \cdot R^2 \therefore$$

$$A_{III} = \frac{1}{4} \cdot \pi \cdot 2^2 = \pi \text{ cm}^2$$

$$A_{\text{Total}} = 16 \text{ cm}^2$$

$$A_{\text{Hachurada}} = 16 - 4 - 4 - \pi = (8 - \pi) \text{ cm}^2$$

02



$$x^2 = 25 + 25 \therefore x^2 = 50 \text{ cm}^2$$

$$A_{\text{Círculo}} = \pi R^2$$

$$A_{\text{Círculo}} = 25\pi \text{ cm}^2$$

$$A_{\text{Hachurada}} = A_C - A_{\square}$$

$$A_{\text{Hachurada}} = 25\pi - 50$$

$$A_{\text{Hachurada}} = 25(\pi - 2) \text{ cm}^2$$

Aula 18

Áreas das figuras planas V



ATIVIDADES PARA SALA

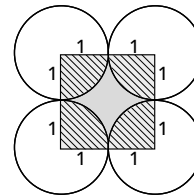
01 a) $A_{\text{Sala}} = 36 \text{ m}^2$

$$A_{\text{Peça}} = 36 : 400 = 0,09 \text{ m}^2$$

A área de cada peça é de 0,09 m².

b) $A_{\text{Peça}} = 0,09 \text{ m}^2 \Rightarrow \text{lado} = 0,3 \text{ m}$
Logo, $2p = 1,2 \text{ m}$.

02 D



$$R = 1$$

$$A_{\square} = 2^2 = 4$$

$$A_{\text{Hachurada}} = \pi \cdot R^2 = \pi \cdot 1^2 = \pi$$

$$A_{\text{Sombreada}} = 4 - \pi$$

03 I. C

$$A = \pi \cdot (3R)^2 = 9R^2\pi$$

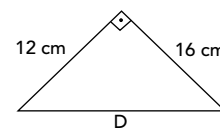
$$C = 2\pi \cdot (3R) = 6R\pi$$

II. a) $A = \frac{1}{2}\pi R^2$

$$A = \frac{1}{2}\pi \cdot 64$$

$$A = 32\pi \text{ cm}^2 \Rightarrow A = 96 \text{ cm}^2$$

b) Como o triângulo é retângulo, a hipotenusa é o diâmetro da circunferência.



$$D^2 = 12^2 + 16^2$$

$$D^2 = 144 + 256$$

$$D = 20 \therefore R = 10$$

$$A_O = \pi \cdot 10^2$$

$$A_O = 100\pi \text{ cm}^2$$

$$A_{\Delta} = \frac{12 \cdot 16}{2}$$

$$A_{\Delta} = 96 \text{ cm}^2$$

$$A_{\text{Sombreada}} = A_O - A_{\Delta}$$

$$A_{\text{Sombreada}} = 100\pi - 96$$

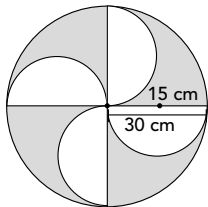
$$A_{\text{Sombreada}} = 204 \text{ cm}^2$$

03 a) $A_C = \frac{1}{12} \cdot \pi \cdot 8^2 = \frac{64\pi}{12} = \frac{16\pi}{3} \text{ cm}^2$

b) $A_C = \frac{1}{8} \cdot \pi \cdot 10^2 = \frac{100\pi}{8} = \frac{25\pi}{2} \text{ cm}^2$

04 $A_C = \frac{1}{6} \cdot \pi \cdot 6^2 = \frac{36\pi}{6} = 6\pi \text{ m}^2$

05



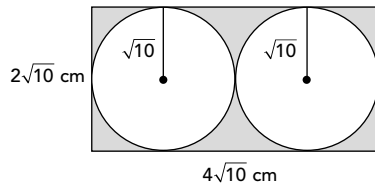
$$A_{\text{Branca}} = 2\pi R^2 = 2 \cdot \pi \cdot 15^2 = 450\pi \text{ cm}^2$$

$$A_{\text{Total}} = \pi \cdot 30^2 = 900\pi \text{ cm}^2$$

$$A_{\text{Sombreada}} = A_{\text{Total}} - A_{\text{Branca}}$$

$$A_{\text{Sombreada}} = 900\pi - 450\pi = 450\pi \text{ cm}^2$$

06

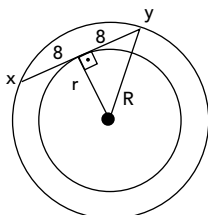


$$A_{\text{Total}} = 2\sqrt{10} \cdot 4\sqrt{10} = 8 \cdot 10 = 80 \text{ cm}^2$$

$$A_{\text{Círculos}} = 2\pi R^2 = 2 \cdot \pi \cdot 10 = 20\pi \text{ cm}^2$$

$$A_{\text{Desperdiçada}} = 80 - 62 = 18 \text{ cm}^2$$

07 C



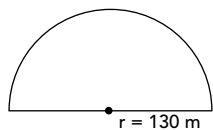
$$R^2 = r^2 + 8^2$$

$$R^2 - r^2 = 64$$

$$A_{\text{Coroa}} = \pi R^2 - \pi r^2 = \pi(R^2 - r^2)$$

$$A_{\text{Coroa}} = 64\pi$$

04 B



$$A = \frac{\pi r^2}{2} = \frac{\pi \cdot 130^2}{2}$$

$$A = \frac{16900\pi}{2}$$

$$A = 8450\pi \text{ m}^2$$

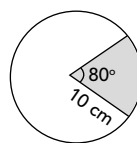
$$N^\circ \text{ de pessoas} = 8450 \cdot 3,14 \cdot 4 = 106132$$

05

$$\frac{(x+1+x+6) \cdot 7^1}{2} = 56^8 \therefore 2x+7 = 16 \therefore 2x = 9 \therefore$$

$$x = 4,5 \text{ cm}$$

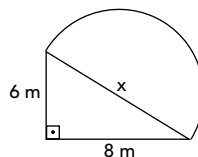
b)



$$A_{\text{Sombreada}} = \frac{280}{360} \cdot \pi \cdot 10^2 = \frac{7\pi \cdot 100}{9}$$

$$A_{\text{Sombreada}} = \frac{700\pi}{9} \text{ cm}^2$$

05



$$x^2 = 36 + 64 \therefore x^2 = 100$$

$$x = 10 \text{ m} \therefore r = 5$$

$$A_{\square} = \frac{6 \cdot 8}{2} = 24 \text{ m}^2$$

$$A_{\odot} = \frac{\pi R^2}{2} = \frac{\pi 5^2}{2} = \frac{25\pi}{2} \text{ m}^2$$

$$A_{\text{Total}} = \frac{25\pi}{2} + 24 = \frac{25\pi + 48}{2} \text{ m}^2$$



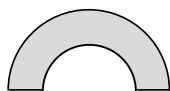
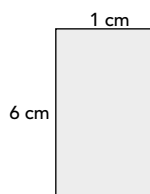
ATIVIDADES PROPOSTAS

01

a) $A_C = (R^2 - r^2) \cdot \pi$
 $A_C = (9^2 - 6^2) \cdot \pi$
 $A_C = (81 - 36) \cdot \pi$
 $A_C = 45\pi \text{ cm}^2$

b) $C = 2\pi R$
 $38\pi = 2\pi R$
 $R = 19 \text{ cm}$
 $A = \pi \cdot R^2 = \pi \cdot 19^2$
 $A = 361\pi \text{ cm}^2$

02



$$A = \frac{(R^2 - r^2) \cdot \pi}{2}$$

$$A = \frac{(9 - 4) \cdot \pi}{2}$$

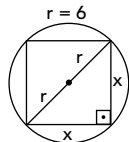
$$A = \frac{5\pi}{2}$$

$$A_{\text{Total}} = \left(\frac{5\pi}{2} + 12 \right) \text{ cm}^2$$

$$A = 6 \cdot 1$$

$$A = 6 \Rightarrow A = 6 \cdot 2 = 12 \text{ cm}^2$$

03

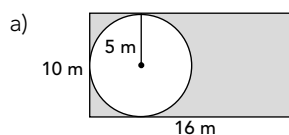


$$x^2 + x^2 = 12^2$$

$$2x^2 = 144$$

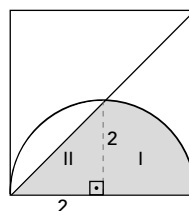
$$x^2 = 72 \text{ cm}^2$$

04



a) $A_O = \pi \cdot 5^2 = 25\pi \text{ m}^2$
 $A_{\square} = 160 \text{ m}^2$
 $A_{\text{Sombreada}} = (160 - 25\pi) \text{ m}^2$

06 B

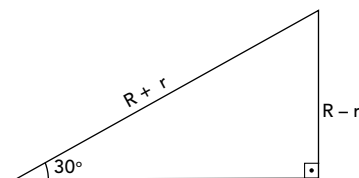
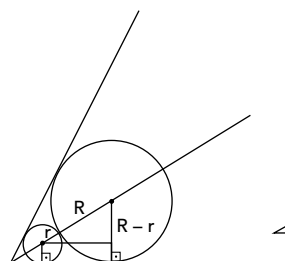


$$A_I = \frac{\pi \cdot 2^2}{4} = \frac{4\pi}{4} = \pi$$

$$A_{II} = \frac{2 \cdot 2}{2} = 2$$

$$A_{\text{Hachurada}} = \pi + 2$$

07 E



$$\text{I. } \sin 30^\circ = \frac{R-r}{R+r} = \frac{1}{2}$$

$$2R - 2r = R + r$$

$$R = 3r$$

$$\text{II. Razão} = \frac{\pi \cdot r^2}{\pi \cdot R^2} = \left(\frac{r}{3r} \right)^2 = \frac{r^2}{9r^2} = \frac{1}{9}$$

Aula 19

Revisão I

01 C

$$(x-3) \cdot (x+2) = x \cdot (x-2)$$

$$\cancel{x^2} + 2x - 3x - 6 = \cancel{x^2} - 2x$$

$$2x - x = 6 \therefore x = 6$$

02 $3x \cdot x = (x+6) \cdot (x+3)$

$$3x^2 = x^2 + 9x + 18$$

$$2x^2 - 9x - 18 = 0$$

$$\Delta = 225 \therefore x = \frac{9 \pm 15}{4} \begin{cases} x' = 6 \\ x'' = -1,5 \notin \mathbb{N} \end{cases}$$

03 $\frac{x-5}{10} = \frac{6}{2x+4} \therefore 2x^2 + 4x - 10x - 20 = 60$

$$2x^2 - 6x - 80 = 0$$

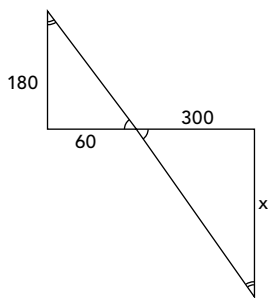
$$x^2 - 3x - 40 = 0$$

$$(x-8) \cdot (x+5) = 0$$

$$x = 8$$

Razão de semelhança: $\frac{3}{10}$

04

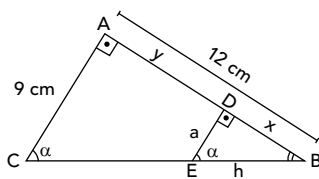


$$\frac{60}{300} = \frac{180}{x}$$

$$x = 900 \text{ cm}$$

$$x = 9 \text{ m}$$

05 B



$$x + y = 12 \Rightarrow y = 8 \text{ cm}$$

$$k + 2k = 12 \Rightarrow x = 4 \text{ cm}$$

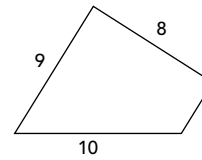
$$k = 4$$

$$\frac{9}{a} = \frac{12}{4}$$

$$a = 3$$

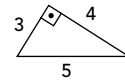
$$\text{Logo, } h = 5$$

I.



$$\frac{2p_I}{2p_{II}} = \frac{30}{12} = \frac{5}{2}$$

II.



06 a) $4x^2 + 12x + 9 = 4x + x^2 + 10x + 25$

$$3x^2 - 2x - 16 = 0$$

$$\Delta = (-2)^2 - 4 \cdot 3 \cdot (-16)$$

$$\Delta = 4 + 192 \therefore \Delta = 196$$

$$x = \frac{2 \pm 14}{6} \begin{cases} x' = \frac{16}{6} = \frac{8}{3} \\ x'' = \frac{-12}{6} = -2 \notin \mathbb{N} \end{cases}$$

$$x = \frac{8}{3}$$

b) $\left(\frac{x+2}{2}\right)^2 + 8^2 = x^2$

$$\frac{x^2 + 4x + 4}{4} + 64 = x^2$$

$$x^2 + 4x + 4 + 256 = 4x^2$$

$$3x^2 - 4x - 260 = 0$$

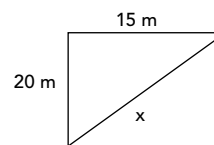
$$\Delta = (-4)^2 - 4 \cdot 3 \cdot (-260)$$

$$\Delta = 16 + 3120 = 3136$$

$$x = \frac{4 \pm 56}{6} \begin{cases} x' = 10 \\ x'' = \frac{-52}{6} \notin \mathbb{N} \end{cases}$$

$$x = 10$$

07



$$x^2 = 15^2 + 20^2$$

$$x^2 = 225 + 400$$

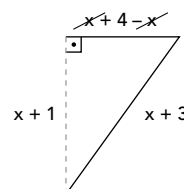
$$x^2 = 625$$

$$x = 25$$

$$25 \text{ m} \Rightarrow 1 \text{ s}$$

$$25 \text{ m} \cdot 60 = 1500 \text{ m}$$

08



$$(x+3)^2 = (x+1)^2 + 16$$

$$\cancel{x^2} + 6x + 9 = \cancel{x^2} + 2x + 1 + 16$$

$$4x = 8 \therefore x = 2$$

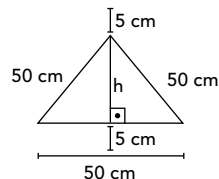
$$2p = (x+1) + (x+4) + (x+3) + x$$

$$2p = 3 + 6 + 5 + 2 = 16$$

09 C

$$\begin{aligned}x^2 + 40^2 &= 50^2 \\x^2 &= 2500 - 1600 \\x^2 &= 900 \\x &= 30 \text{ km}\end{aligned}$$

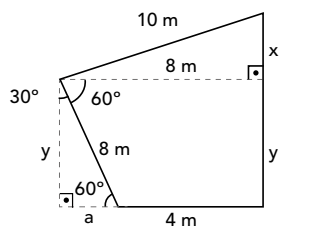
10



$$h_{\text{Pilha}} = \frac{50\sqrt{3}}{2} + 5 + 5 = (10 + 25\sqrt{3}) \text{ cm}$$

11 C

$$\begin{aligned}\text{I. } \sin 30^\circ &= \frac{a}{8} \\ \frac{1}{2} &= \frac{a}{8} \rightarrow a = 4 \\ \text{II. } a + 4 &= 8 \\ x^2 + 8^2 &= 10^2 \\ x^2 &= 36 \\ x &= 6 \\ y^2 + 4^2 &= 8^2 \\ y^2 &= 48\end{aligned}$$

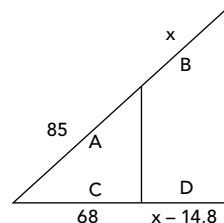


$$\begin{aligned}y &= 4\sqrt{3} \\ y &= 4 \cdot 1,7 \therefore y = 6,8 \\ \text{III. } x + y &= 6 + 6,8 = 12,8 \text{ m}\end{aligned}$$

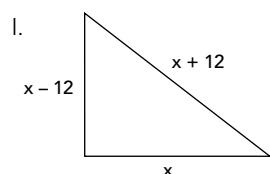
$$\frac{85}{x} = \frac{68}{x - 14,8}$$

$$\begin{aligned}4x &= 5x - 74 \\ x &= 74 \text{ m}\end{aligned}$$

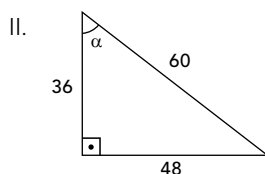
12



13



$$\begin{aligned}(x + 12)^2 &= x^2 + (x - 12)^2 \\ x^2 + 24x + 144 &= x^2 + x^2 - 24x + 144 \\ x^2 - 48x &= 0 \\ x &= 48\end{aligned}$$

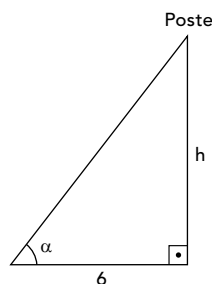


$$\sin \alpha = \frac{48}{60} = \frac{4}{5}$$

$$\cos \alpha = \frac{36}{60} = \frac{3}{5}$$

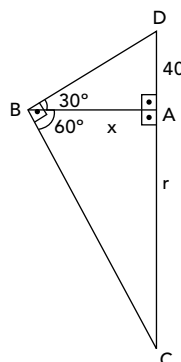
$$\tan \alpha = \frac{48}{36} = \frac{4}{3}$$

14 D



$$\begin{aligned}\tan \alpha &= \frac{h}{6} = \frac{4}{3} \\ h &= 8 \text{ m}\end{aligned}$$

15



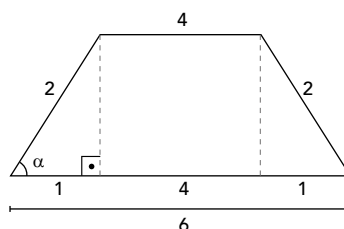
$$\tan 30^\circ = \frac{40}{x} = \frac{\sqrt{3}}{3}$$

$$x = \frac{120\sqrt{3}}{3} = 40\sqrt{3} \text{ m}$$

$$\tan 60^\circ = \frac{r}{40\sqrt{3}} = \sqrt{3}$$

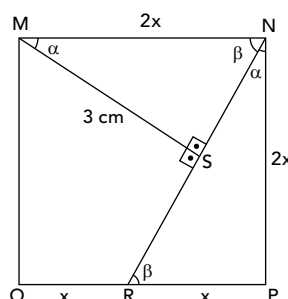
$$r = 120 \text{ m}$$

16 A



$$\begin{aligned}\cos \alpha &= \frac{1}{2} \\ \alpha &= 60^\circ\end{aligned}$$

17 B



$$\begin{aligned}\overline{NR}^2 &= (2x)^2 + x^2 \\ \overline{NR}^2 &= 4x^2 + x^2 \\ \overline{NR}^2 &= 5x^2 \\ \overline{NR} &= x\sqrt{5}\end{aligned}$$

$$\cos \alpha = \frac{3}{2x} = \frac{2x}{x\sqrt{5}}$$

$$4x^2 = 3x\sqrt{5}$$

$$4x = 3\sqrt{5} \therefore x = \frac{3\sqrt{5}}{4}$$

$$\ell = 2x = \frac{6\sqrt{5}}{4} \therefore \ell = 1,5 \cdot \sqrt{5}$$

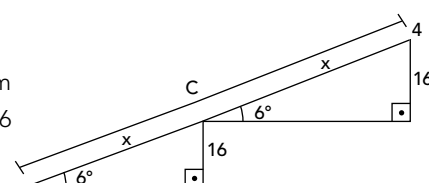
18 E

$$\sin 6^\circ = \frac{16}{x} = \frac{1}{10}$$

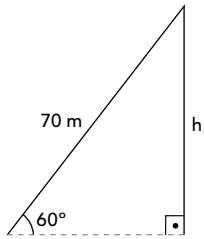
$$x = 160 \text{ cm} = 1,6 \text{ m}$$

$$c = 2x \Rightarrow c = 2 \cdot 1,6$$

$$c = 3,2 \text{ m}$$



19 A



$$\sin 60^\circ = \frac{h}{70} = \frac{\sqrt{3}}{2} \therefore h = 35\sqrt{3}$$

$$h = 35 \cdot 1,73$$

$$h = 60,55$$

$$\text{Altura da pipa} = h + 1,80 = 60,55 + 1,80 = 62,35 \text{ m}$$

24 Pela figura: $3m - 48^\circ = m + n$ e $4m - 12^\circ + n = 180^\circ$

$$\begin{cases} 2m - n = 48^\circ \\ 4m + n = 192^\circ \end{cases}$$

$$\underline{4m + n = 192^\circ} \Rightarrow 4 \cdot 40 + n = 192^\circ$$

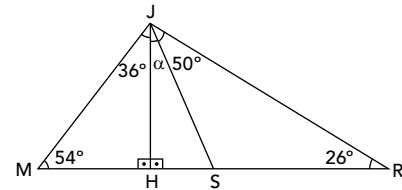
$$6m = 240$$

$$m = 40^\circ$$

$$n = 192^\circ - 160^\circ$$

$$n = 32^\circ$$

25

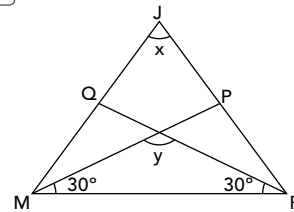


$$\hat{J} = 100^\circ$$

$$36 + \alpha = 50^\circ$$

$$\alpha = 14^\circ$$

26



No triângulo equilátero:

mediana = bissetriz

$$x = 60^\circ$$

$$y + 30^\circ + 30^\circ = 180^\circ$$

$$y = 120^\circ$$

$$\text{Assim, } y = 2x \text{ ou } x = \frac{y}{2}$$

27 I. Caso L.A.L.

$$\text{II. } x + 12^\circ = 72^\circ$$

$$x = 60^\circ$$

$$y - 12^\circ = 62^\circ$$

$$y = 74^\circ$$

$$x + y = 60^\circ + 74^\circ$$

$$x + y = 134^\circ$$

28 $\triangle BCD \rightarrow 5x + \alpha + \beta = 180^\circ \therefore \alpha + \beta = 180^\circ - 5x$

$$\triangle ABC \rightarrow 2\alpha + 2\beta + x = 180^\circ$$

$$2(\alpha + \beta) + x = 180^\circ$$

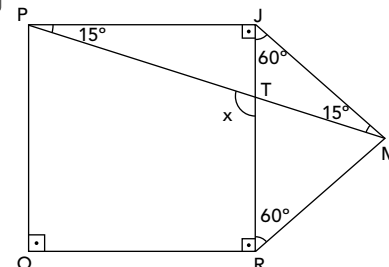
$$2(180^\circ - 5x) + x = 180^\circ$$

$$360^\circ - 10x + x = 180^\circ$$

$$9x = 180^\circ \therefore x = 20^\circ$$

$$\text{Logo, med}(\widehat{BDC}) = 100^\circ$$

29



$$x = 180^\circ - 60^\circ - 15^\circ$$

$$x = 105^\circ$$

$$\widehat{RTP} = 105^\circ$$

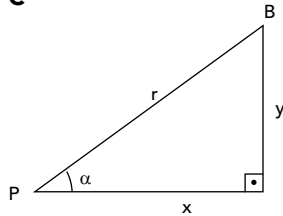
20 I. A

$$907 - 846 = 61 \Rightarrow 61 \cdot 8 = 488$$

$$2012 \xrightarrow{8 \text{ anos}} 2020$$

$$\text{Então: } 907 + 488 = 1395 \text{ bilhões} = 1,395 \text{ trilhões de reais}$$

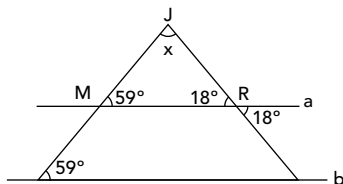
II. C



$$\cos \alpha = \frac{x}{r} \therefore x = r \cdot \cos \alpha$$

$$\sin \alpha = \frac{y}{r} \therefore y = r \cdot \sin \alpha$$

21



$$x + 59^\circ + 18^\circ = 180^\circ$$

$$x = 180^\circ - 77^\circ$$

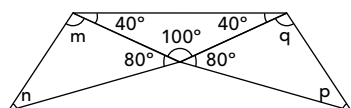
$$x = 103^\circ$$

Obtusângulo

22 $\overline{JM} = 5 \text{ cm}$, $\overline{MR} = 10 \text{ cm}$ e $\overline{JR} = 30 \text{ cm}$

Não é possível, pois $\overline{JR} > \overline{JM} + \overline{MR}$, contradizendo a condição de existência dos triângulos.

23



$$\hat{m} + \hat{n} = 100^\circ$$

$$\hat{p} + \hat{q} = 100^\circ$$

Logo,

$$\hat{m} + \hat{n} + \hat{p} + \hat{q} = 200^\circ$$

30 a) $5x + x = 180^\circ$

$6x = 180^\circ$

$x = 30^\circ$

c) $x + 42^\circ = 180^\circ$

$x = 138^\circ$

b) $2x + 43^\circ + 5x - 24^\circ = 180^\circ$

$7x + 19 = 180^\circ$

$7x = 161$

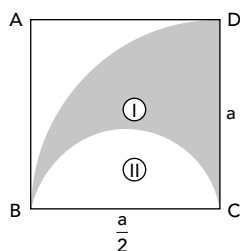
$x = 23^\circ$

d) $3x - 52^\circ = x$

$2x = 52^\circ$

$x = 26^\circ$

31 B



$A_{I+II} = \frac{1}{4} \cdot \pi r^2 = \frac{1}{4} \cdot \pi \cdot a^2$

$A_{II} = \frac{\pi r^2}{2} = \frac{1}{2} \cdot \pi \cdot \frac{a^2}{4} = \frac{\pi a^2}{8}$

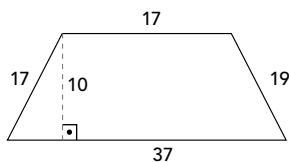
$A_I = \frac{\pi a^2}{4} - \frac{\pi a^2}{8} = \frac{\pi a^2}{8}$

Portanto, a região sombreada corresponde a um oitavo da área do círculo de raio de medida **a**.

32 $7x + 3 = 5x + 7$

$2x = 4 \therefore x = 2$

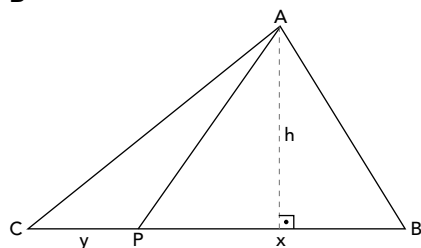
$A = \frac{(17+37) \cdot 10^5}{2}$



$A = 54 \cdot 5 = 270$

$2P = 17 + 17 + 19 + 37 = 90$

33 B



$A_{\triangle ABP} = \frac{x \cdot h}{2} = 40 \therefore xh = 80 \text{ (I)}$

$A_{\triangle APC} = \frac{y \cdot h}{2} = 10 \therefore yh = 20 \text{ (II)}$

$\frac{I}{II} = \frac{xh}{yh} = \frac{80}{20}$

$\frac{x}{y} = \frac{BP}{PC} = 4$

34

a) $A = 9^2 = 81 \text{ cm}^2$

b) $A = 12,3 \cdot 7 = 86,1 \text{ cm}^2$

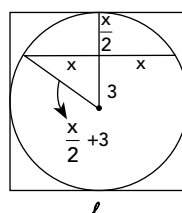
c) $A = 12 \cdot 8 = 96 \text{ cm}^2$

d) $A = \frac{3,8 \cdot 5,2}{2} = 9,88 \text{ cm}^2$

e) $A = \frac{12 \cdot 7}{2} = 42 \text{ cm}^2$

f) $A = \frac{(6+9) \cdot 4}{2} = 15 \cdot 2 = 30 \text{ cm}^2$

35 D



$\left(\frac{x}{2} + 3\right)^2 = x^2 + 3^2$

$\frac{x^2}{4} + 3x + 9 = x^2 + 9$

$x^2 + 12x = 4x^2 \Rightarrow 3x^2 = 12x$

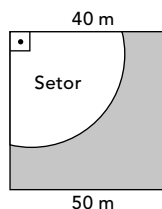
$3x = 12 \Rightarrow x = 4$

Logo, o lado do quadrado é:

$l = 2\left(\frac{x}{2} + 3\right) = 2 \cdot \left(\frac{4}{2} + 3\right) = 2 \cdot 5 = 10$

$A_{\square} = l^2 = 10^2 = 100$

36 A



$A_{\text{Total}} = 50^2 = 2500 \text{ m}^2$

$A_{\text{Setor}} = \frac{\pi R^2}{4} = \frac{3,14 \cdot 40^2}{4}$

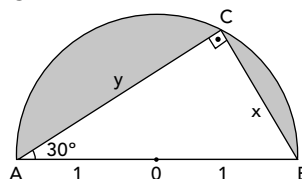
$A_{\text{Setor}} = \frac{5024}{4} = 1256 \text{ m}^2$

$A_{\text{Hachurada}} = A_{\text{Total}} - A_{\text{Setor}}$

$A_{\text{Hachurada}} = 2500 - 1256$

$A_{\text{Hachurada}} = 1244 \text{ m}^2$

37 C



$\sin 30^\circ = \frac{x}{2} = \frac{1}{2} \therefore x = 1$

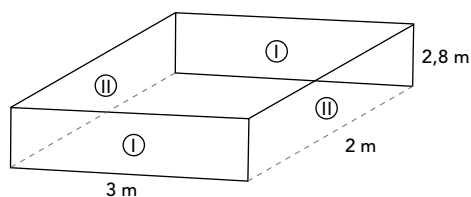
$\cos 30^\circ = \frac{y}{2} = \frac{\sqrt{3}}{2} \therefore y = \sqrt{3}$

$AC = \frac{\pi R^2}{2} = \frac{\pi \cdot 1^2}{2} = \frac{\pi}{2}$

$A_{\triangle} = \frac{x \cdot y}{2} = \frac{\sqrt{3}}{2}$

$A_{\text{Sombreada}} = \frac{\pi}{2} - \frac{\sqrt{3}}{2} = \frac{\pi - \sqrt{3}}{2}$

38 C



$$A_I = 2 \cdot 3 \cdot 2,8 = 16,8 \text{ m}^2$$

$$A_{II} = 2 \cdot 2 \cdot 2,8 = 11,2 \text{ m}^2$$

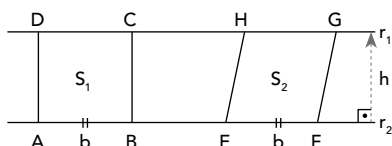
$$\text{Portas} + \text{Janelas} = 4 \text{ m}^2$$

$$A_{\text{Total}} \text{ a ser azulejada} = 16,8 + 11,2 - 4 = 24 \text{ m}^2$$

$$10\% \cdot 24 = 2,4 \text{ m}^2$$

Assim, a metragem será 26,40 m².

39 C



$$S_1 = b \cdot h$$

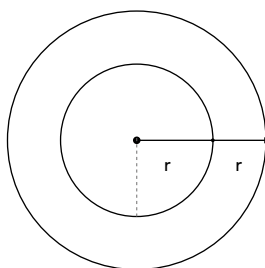
$$S_2 = b \cdot h$$

$$\text{Logo, } S_1 = S_2.$$

40 I. $A_{\text{sala}} = 9 \text{ m} \cdot 6 \text{ m}$
 $A_{\text{sala}} = 900 \text{ cm} \cdot 600 \text{ cm}$
 $A_{\text{sala}} = 540000 \text{ cm}^2$
 $A_{\text{lajota}} = 30^2 = 900 \text{ cm}^2$
 Número de lajotas = $\frac{540000}{900} + 30 =$
 $= 600 + 30 = 630$

$$\text{Valor} = 630 \cdot 5,20 = \text{R\$ } 3276,00$$

II.



$$A_{\text{Coroa}} = (R^2 - r^2) \cdot \pi$$

$$A_{\text{Coroa}} = [(2r)^2 - \pi^2] \cdot \pi = (4r^2 - r^2) \pi = 3r^2 \pi$$

$$147\pi = 3r^2\pi \therefore r^2 = 49 \therefore r = 7 \text{ cm}$$

$$\text{Assim, } D = 4r = 4 \cdot 7 = 28 \text{ cm.}$$

Aula 20

Sistema métrico decimal I



ATIVIDADES PARA SALA

01 C

$$31000 \text{ pés}$$

$$6000 \text{ m} \cdot 3,3 = 19800 \text{ pés}$$

$$31000 - 19800 = 11200 \text{ pés}$$

02 C

$$2 \cdot 81 + 190 = 352 \text{ m}$$

$$352 : 48 \approx 7,3$$

03 Se:

$$1 \text{ cm} \Rightarrow 10 \text{ km}$$

Então:

$$1 \text{ cm}^2 \Rightarrow 100 \text{ km}^2$$

Logo:

$$12,43 \text{ cm}^2 \Rightarrow 12,43 \cdot 100 \text{ km}^2 = 1243 \text{ km}^2$$

04 D

$$2p = 8 + 3 = 11 \text{ m}$$

$$11 \text{ m} \cdot 20 \text{ quadros} = 220 \text{ m}$$

$$220 - 200 = 20 \text{ m}$$

05 D

$$C = 90 \cdot 3,14 = 282,6$$

$$\text{Distância} = 282,6 \cdot 2000$$

$$\text{Distância} = 565200 \text{ cm}$$

$$= 5,652 \text{ km}$$



ATIVIDADES PROPOSTAS

01 E

$$8 \text{ ha} = 8 \text{ hm}^2 = 80000 \text{ m}^2$$

02 C

$$A_I = 5 \cdot 8 = 40 \text{ m}^2$$

$$\text{Modelo A} \Rightarrow \text{II e III}$$

$$A_{II} = 5 \cdot 6 = 30 \text{ m}^2$$

$$\text{Modelo B} \Rightarrow \text{I e IV}$$

$$A_{III} = 4 \cdot 6 = 24 \text{ m}^2$$

$$A_{IV} = \frac{(4 + 6) \cdot 7}{2} = 35 \text{ m}^2$$

03 E

$$16 \cdot 25000 = 400000 = 4 \text{ km}$$

$$4 \text{ km} \cdot 2 = 8 \text{ km}$$

$$\text{Em 5 dias} = 5 \cdot 8 = 40 \text{ km}$$

04 D

Calculando o valor do km rodado para cada aeroporto:

$$\text{Ezeiza} = \frac{0,95}{35} \approx 0,03$$

$$\text{Cumbica} = \frac{7,45}{30} \approx 0,25$$

$$\text{J.F.K.} = \frac{6}{24} \approx 0,25$$

$$\text{Heathrow} = \frac{17,60}{24} \approx 0,73$$

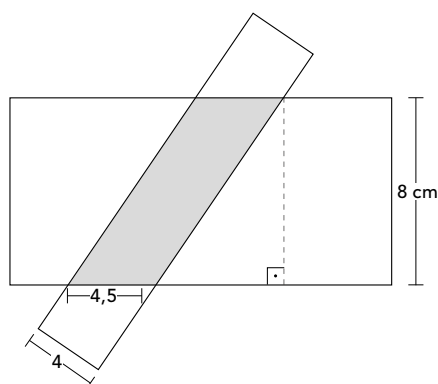
$$\text{Galeão} = \frac{11}{20} = 0,55$$

Portanto, o valor do km é mais caro em Heathrow.

05 D

$$A_{\text{terreno}} = 120 \cdot 60 = 7200 \text{ m}^2 : 100 = 72 \text{ banheiros}$$

06 E



$$A_s = 4,5 \cdot 8 = 36 \text{ cm}^2$$

07 B

Há 200 pastilhas $\begin{cases} \rightarrow 40 \text{ pretas} \\ \rightarrow 160 \text{ brancas} \end{cases}$

$$\text{Logo, } \left. \begin{array}{l} 40 \cdot 10 = 400 \\ 160 \cdot 8 = 1280 \end{array} \right\} \frac{1680}{200} = 8,40$$

Aula 21

Sistema métrico decimal II

ATIVIDADES PARA SALA

01 a) $A = 6 \cdot a^2 = 6 \cdot 3^2 = 54 \text{ dam}^2 = 5400 \text{ m}^2$

b) $V = a^3 = 3^3 = 27 \text{ dam}^3 = 27000000 \text{ dm}^3$

02 B

- a) (F) A massa é obtida pelo produto do volume pela densidade.
- b) (V)
- c) (F) A superfície é medida de área (duas dimensões).
- d) (F) A capacidade é obtida por meio do volume.
- e) (F) O comprimento é medida linear (uma dimensão).

03 C

$$V_{\text{água}} = 40 \cdot 30 \cdot 20 = 24000 \text{ cm}^3$$

$$V_{\text{objeto}} = 40 \cdot 30 \cdot 2 = 2400 \text{ cm}^3$$

$$\rightarrow h = 2 \text{ cm}$$

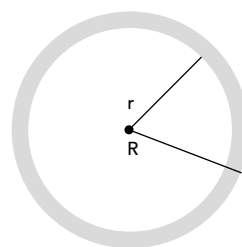
$$\text{Então: } 20 + 2 = 22$$

04 D

$$V_{\text{caixa}} = 25 \cdot 10 \cdot 15 = 3750 \text{ cm}^3$$

$$V_{\text{total}} = 125 \cdot 3750 = 468750 \text{ cm}^3$$

05 D



$$R = r + 0,2$$

$$R = 1,2$$

$$V = \pi R^2 h - \pi r^2 h$$

$$V = \pi h (R^2 - r^2)$$

$$V = 3,1 \cdot 4 (1,44 - 1)$$

$$V = 12,4 \cdot 0,44$$

$$V = 5,456 \text{ m}^3$$

Como o metro cúbico de concreto custa R\$ 10,00, o valor gasto foi de R\$ 54,56.



ATIVIDADES PROPOSTAS

01 Caixa = 300 cm = 3 m

$$V_{\text{caixa}} = 3^3 = 27 \text{ m}^3$$

O número de caixas será: 3 caixas de comprimento (pois não poderá ultrapassar os 10 metros), 6 caixas de largura (não ultrapassando os 20 metros) e 5 caixas de altura. Logo, o número de caixas que poderão ser armazenadas é de $3 \cdot 6 \cdot 5 = 90$.

$$V_{\text{Total}} = 90 \cdot 27 = 2430 \text{ m}^3$$

02 C

$$V_{\text{pacote}} = 20 \cdot 20 \cdot 30 = 12000 \text{ cm}^3 \cdot 100 = 1200000$$

$$V_{\text{caixa}} = 40 \cdot 40 \cdot 60 = 96000 \text{ cm}^3$$

$$\frac{1200000}{96000} = 12,5$$

06 A

$14\,600\text{ L} = 14\,600\text{ dm}^3 = 14,6\text{ m}^3 \cdot 5 = 73$ peixes em cada tanque. Se há 7 tanques, então: $7 \cdot 73 = 511$ peixes = 511 litros de ração por semana. Portanto, a capacidade mínima do silo deverá ser de 511 litros.

07 a) $y = 45x + 450$

b) $480 = 45x + 450$

$$45x = 30 \therefore x = \frac{2}{3} \text{ minutos} = 40 \text{ seg}$$

c) $45x + 450 = 3000$

$$45x = 2550$$

$$x = 56 \frac{30}{45} = 56 \frac{2}{3}$$

$$x = 56 \text{ min e } 40 \text{ seg}$$

Aula 23

Massa, tempo e capacidade II



ATIVIDADES PARA SALA

01 $1\text{ kg} \Rightarrow 16\text{ m}^2$

$$771,68 : 16 = 48,23\text{ kg} = 48\,230\text{ g}$$

02 C

$$V_c = \pi \cdot 2^2 \cdot 10 = 40\pi$$

$$V_c = 40 \cdot 3 = 120\text{ cm}^3 = 120\text{ mL}$$

A mistura é: 1 parte de açúcar para 5 partes de água, ou seja, $\frac{5}{6}$ do volume do copo são utilizados.

$$V_{\text{H}_2\text{O}} = \frac{5}{6} \cdot 120 = 100\text{ mL}$$

03 $V = 43,5 \cdot 38 \cdot h = 57\,855\text{ L}$

$$1\,653\text{ h} = 57\,855\text{ cm}^3$$

$$h = \frac{57\,855}{1\,653} \therefore h = 35\text{ cm} = 0,35\text{ m}$$

04 C

$$1\text{ fl oz} \Rightarrow 2,95\text{ cL} = 29,5\text{ mL}$$

$$355 : 29,5 = 12,03$$

05 $V = 2 \cdot 3 \cdot 1,5 = 9\text{ m}^3$

$$V_{\text{liquido}} = \frac{2}{3} \cdot 9 = 6\text{ m}^3 = 6\,000\text{ L}$$

$$\text{Valor} \Rightarrow 6\,000 \cdot 4,50 = \text{R\$ } 27\,000,00$$



ATIVIDADES PROPOSTAS

01 B

Relação de atividades para 200 calorias:

40 minutos $\Rightarrow$ Agachamentos

60 minutos $\Rightarrow$ Supermercado

30 minutos $\Rightarrow$ Jardim

30 minutos $\Rightarrow$ Passeio com o cachorro

40 minutos $\Rightarrow$ Retirar pó dos móveis

30 minutos $\Rightarrow$ Lavagem de roupas

230 minutos

- 170 ajuste

60 minutos

02 B

60 litros $\Rightarrow$ 4 descargas por dia

Bacia ecológica: $4 \cdot 6 = 24$ litros

Assim, a economia será:

60 litros - 24 litros = 36 litros

03 I. D

$$\text{R\$ } 53,23 \cdot 2 = \text{R\$ } 106,46$$

II. D

$$\text{Volume} = 10\text{ m}^3 (\text{mínimo}) + 7\text{ m}^3 (\text{excedente}) = 17\text{ m}^3$$

$$\text{Dobrando} = 34\text{ m}^3 \Rightarrow 10\text{ m}^3 + 10\text{ m}^3 + 10\text{ m}^3 + 4\text{ m}^3:$$

$$\left. \begin{array}{l} \blacksquare 10 (\text{tarifa mínima}) = 5,50 \\ \blacksquare 11 \text{ a } 20 = 10 \cdot 0,85 = 8,50 \\ \blacksquare 21 \text{ a } 30 = 10 \cdot 2,13 = 21,30 \\ \blacksquare 31 \text{ a } 34 = 4 \cdot 2,13 = 8,52 \end{array} \right\} \text{Total} = \text{R\$ } 43,82$$

04 A

$$\text{Batata} = \frac{560}{200} = 2,8\text{ cal/g}$$

$$\text{Sanduíche} = \frac{500}{250} = 2\text{ cal/g}$$

$$2x + 2,8y = 462$$

05 B

A partir de 15 m^3 de consumo, cada m^3 custa R\\$ 2,00.

Logo, conclui-se que para gastar R\\$ 19,00 deve-se consumir 17 m^3 .

06 $V_1 = a \cdot b \cdot 2 = 160 \Rightarrow ab = 80$

$$V_2 = a \cdot c \cdot 4 = 160 \Rightarrow ac = 40$$

$$V_3 = b \cdot c \cdot 5 = 160 \Rightarrow bc = 32$$

$$\frac{a^2 b^2 c^2}{a^2 b^2 c^2} = \frac{80 \cdot 40 \cdot 32}{a^2 b^2 c^2} = 102\,400$$

$$abc = \sqrt{102\,400} \Rightarrow abc = 320$$

Logo, $a = 10$, $b = 8$ e $c = 4$.

07 $1 \text{ h} = 60 \text{ min} = 60 \cdot 60 = 3600 \text{ s}$; $20 \text{ s} = 180 \cdot 7 = 1260 \text{ gotas}$
 $V = 1260 \cdot 0,2 = 252 \text{ mL}$

Aula 24

Massa, tempo e capacidade III

ATIVIDADES PARA SALA

01 $3 \text{ polegadas} + 5 \text{ milhas} + 2 \text{ léguas} - 10 \text{ jardas} =$
 $= 3 \cdot 2,54 \text{ cm} + 5 \cdot 1609 \text{ m} + 2 \cdot 5555 \text{ m} - 10 \cdot 91,44 \text{ cm}$
 $= 7,62 \text{ cm} + 8045 \text{ m} + 11110 \text{ m} - 914,4 \text{ cm}$
 $= (0,0000762 + 8,045 + 11,11 - 0,00914) \text{ km}$
 $= 19,1459362 \text{ km}$

02 B

	L/kg	Quantidade (kg)	Total (L)
Milho	1000	100	$100 \cdot 10^3$
Trigo	1500	100	$150 \cdot 10^3$
Arroz	2500	100	$250 \cdot 10^3$
Carne de porco	5000	100	$500 \cdot 10^3$
Carne de boi	17000	600	$10200 \cdot 10^3$

Total = $11200 \cdot 10^3$

Média = $\frac{11200 \cdot 10^3 \text{ L}}{10^3 \text{ kg}} = 11200 \text{ L/kg}$

03 C

$V_{\text{inferior}} = \pi \cdot (2x)^2 \cdot h = 4x^2 h \pi$

$V_{\text{superior}} = \pi \cdot x^2 \cdot h = x^2 h \pi$

$V_{\text{inferior}} = 4V_{\text{superior}}$

Se em 10 minutos a torneira enche o cilindro inferior, então encherá o cilindro superior, que é 4 vezes menor que o inferior, em: $10 : 4 = 2,5$ minutos.

04 C

$100 \text{ anos} \longrightarrow 5,8^\circ \text{C}$

$1 \text{ ano} \longrightarrow 0,058^\circ \text{C}$

$2 : 0,058 = 34,48 \text{ anos}$

05 C

$V_{\text{marca I}} = 10 \cdot 6 \cdot 4 = 240 \text{ cm}^3$

$V_{\text{marca II}} = 5 \cdot 6 \cdot 7 = 210 \text{ cm}^3$

$240 - 210 = 30 \text{ cm}^3$



ATIVIDADES PROPOSTAS

01 B

$9 \text{ kcal} \Rightarrow 1 \text{ g de gordura}$

$54000 \text{ kcal} \Rightarrow 6 \text{ kg de gordura}$

$1 \text{ min} \longrightarrow 12 \text{ kcal}$

$x \longrightarrow 54000 \text{ kcal}$

$x = \frac{54000}{12} = 4,5 \cdot 10^3 \text{ min}$

02 Sendo T seu tempo de empresa, tem-se:

$(26 + T) + T = 90$

$2T = 90 - 26$

$2T = 64$

$T = 32$

Logo, será premiado aos 58 anos.

03 C

Nata = N; Leite = L; Chocolate = C

$N + 2C + C = N + 3C \Rightarrow$ Conteúdo dos 6 depósitos

$= 15 + 16 + 18 + 19 + 20 + 31$

$= 119 \text{ litros}$

$N + 3C = 119$

$C = \frac{119 - N}{3}$ (A única divisão exata é quando $N = 20$)

$C = \frac{119 - 20}{3} \therefore C = 33$

Logo, $N + C = 20 + 33 = 53$

04 $V = (1,8)^3 = 5,832 \text{ m}^3 = 5832 \text{ L}$

Consumo diário = $\frac{2}{5} \cdot 5832 = 2332,8$

Consumo semanal = $7 \cdot 2332,8 = 16329,6 \text{ litros}$

05 B

$10 \text{ km}^2 = 10000000 \text{ m}^2 = 10^7 \text{ m}^2$

$5 \text{ cm} = 5 \cdot 10 \text{ mm}$

Volume = $10^7 \cdot 5 \cdot 10 = 5 \cdot 10^8 \text{ litros}$

06 $V = 20 \cdot 18 \cdot 14 = 5040 \text{ cm}^3$

Massa = $5040 \cdot 19,3 = 97272 \text{ g}$

Massa = $97,272 \text{ kg}$

07 C

$$\left. \begin{array}{l} 1 \text{ min} \text{ --- } \frac{1}{40} \text{ do trabalho} \\ 1 \text{ min} \text{ --- } \frac{1}{120} \text{ do trabalho} \end{array} \right\} \text{ Os dois juntos fazem, em 1 min, } \frac{1}{40} + \frac{1}{120} = \frac{4}{120}$$

$$1 \text{ min} \text{ --- } \frac{4}{120} \Rightarrow x = 30 \text{ min}$$

$$x \text{ --- } \frac{120}{120}$$

Logo, como são três automóveis, 90 min.

Aula 25

Razão e proporção I



ATIVIDADES PARA SALA

01 a) $\frac{12}{20} = \frac{3}{5}$

b) $\frac{-6,82}{+2,068} = \frac{-6820}{2068} = \frac{-1705}{517}$

c) $\frac{\frac{1}{3}}{-4} = \frac{1}{3} \cdot \frac{-5}{4} = \frac{-5}{12}$

d) $\frac{2,015 \text{ m}}{1,65 \text{ dm}} = \frac{20,15 \text{ dm}}{1,65} = \frac{2015}{165} = \frac{403}{33}$

e) $\frac{\sqrt{2}}{\sqrt{3}} = \sqrt{2} \cdot \frac{4}{\sqrt{3}} = \frac{4\sqrt{6}}{3}$

02 D

$$32 + 8 = 40 \text{ mil}$$

$$\frac{40}{32} = \frac{x}{28} \therefore x = 35 \text{ mil}$$

03 E

Cálculo para 30 convidados:

$$\text{Carne} = 250 \text{ g} \cdot 30 = 7500 \text{ g} = 7,5 \text{ kg}$$

$$\text{Arroz} = \frac{1}{4} \cdot 30 = 7,5 \text{ copos}$$

$$\text{Farofa} = 4 \cdot 30 = 120 \text{ colheres}$$

$$\text{Vinho} = \frac{1}{6} \cdot 30 = 5 \text{ garrafas}$$

$$\text{Cerveja} = \frac{1}{2} \cdot 30 = 15 \text{ garrafas}$$

$$\text{Espumante} = \frac{1}{3} \cdot 30 = 10 \text{ garrafas}$$

04 A

$$5 \text{ gotas} \text{ --- } 2 \text{ kg}$$

$$30 \text{ gotas} \text{ --- } x$$

$$x = 12 \text{ kg}$$

05 C

$$t = 1 \text{ min } 24 \text{ seg} = 1 + \frac{24}{60} = \frac{84}{60} \text{ min} \cdot \frac{1}{60} = \frac{84}{3600} \text{ h} \Rightarrow$$

$$= \frac{14}{600} \text{ h} = \frac{7}{300} \text{ h}$$

$$d = 2,1 \text{ km} \Rightarrow V = \frac{\frac{21}{10} \text{ km}}{\frac{7}{300} \text{ h}} = \frac{21}{10} \cdot \frac{300}{7} = 90 \text{ km/h}$$



ATIVIDADES PROPOSTAS

01 E

$$\text{Diâmetro} = 42 \text{ m} = 4200 \text{ cm}$$

$$\text{Razão} = \frac{2,1}{4200} = \frac{21}{42000} = \frac{1}{2000}$$

02

$$\frac{x}{y} = \frac{3}{7} \text{ e } \frac{x-6}{y+6} = \frac{19}{51}$$

$$7x - 3y = 0$$

$$51x - 306 = 19y + 114$$

$$51x - 19 = 420$$

$$\begin{cases} 7x + 3y = 0 \cdot (-19) \\ 51x - 19y = 420 \cdot (3) \end{cases} \Rightarrow$$

$$\begin{cases} -133 + 57 = 0 \\ 153x - 57y = 1260 \end{cases}$$

$$20x = 1260$$

$$x = 63$$

Calcular **y**, em:

$$7x - 3y = 0$$

$$7 \cdot 63 - 3y = 0 : (3)$$

$$7 \cdot 21 - y = 0$$

$$y = 147$$

03 E

$$\text{IMC} = 25 \text{ kg/m}^2 \quad \text{massa} = 64 \text{ kg}$$

$$\text{IMC} = \frac{\text{massa}}{\text{altura}^2} \therefore 25 = \frac{64}{h^2}$$

$$h^2 = \frac{64}{25} \Rightarrow h = \frac{8}{5} = 1,6 \text{ m}$$

$$\text{RIP} = \frac{\text{altura (cm)}}{\sqrt[3]{\text{massa}}} = \frac{160}{\sqrt[3]{64}} = \frac{160}{4} = 40 \text{ cm/kg}^{\frac{1}{3}}$$

04

$$\frac{\text{Sódio}}{\text{Cloro}} = \frac{46}{71} = \frac{x}{17,75} \therefore$$

$$71x = 816,5$$

$$x = 11,5 \text{ g}$$

05 C

$$V = \frac{D}{t} \Rightarrow 80 = \frac{D(\text{km})}{\frac{1}{4}(\text{h})} \therefore D = 20 \text{ km}$$

$$12 \text{ min} = \frac{1}{5} \text{ h} \Rightarrow V = \frac{20 \text{ km}}{\frac{1}{5} \text{ h}} = 100 \text{ km/h}$$

06 A

$$1500 d \rightarrow 3060 r \Rightarrow d = R\$2,04$$

$$1250 e \rightarrow 3250 r \Rightarrow e = R\$2,60$$

$$\frac{e}{d} = \frac{2,60}{2,04}$$

$$\frac{e}{d} = 1,2745$$

07 A

$$0,31\overline{2} = \frac{0312 - 03}{990} = \frac{309}{990} = \frac{103}{330}$$

Aula 26

Razão e proporção II

ATIVIDADES PARA SALA

01 E

$$2000 \text{ km} = 200000000 \text{ cm}$$

$$\frac{8}{2000 \cdot 10^5} = \frac{1}{250 \cdot 10^5} = 1:25000000$$

02

$$\frac{\text{Cobre}}{\text{Zinco}} = \begin{cases} \frac{7}{3} = \frac{x}{y} \Rightarrow x = 7k \\ y = 3k \\ x + y = 40 \therefore 10k = 40 \\ k = 4 \end{cases}$$

Cobre = 28 kg; zinco = 12 kg.

03 E

$$\frac{A}{P} = \frac{50}{1} \therefore A = 50 \cdot P$$

$$\frac{A + 400}{P + 16} = \frac{40}{1} \therefore A + 400 = 40P + 640$$

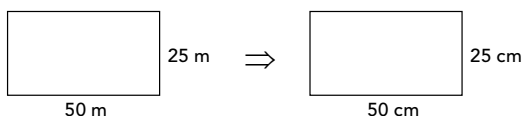
$$50P - 40P = 240$$

$$10P = 240$$

$$P = 24$$

$$A = 50 \cdot 24 = 1200$$

04 C



$$1 \text{ cm} \rightarrow 100 \text{ cm}$$

$$1 \text{ cm} \rightarrow 1 \text{ m}$$

05 D

$$4800 \text{ kWh} \Rightarrow 4,8 \text{ kW} \Rightarrow 1 \text{ h (60 min)}$$

$$\frac{4,8}{60} = 0,08 \text{ kW/min}$$

Ou seja: 1 min $\Rightarrow$ 0,08 kW
 10 min $\Rightarrow$ 0,8 kW
 2 banhos $\Rightarrow$ 1,6 kW
 7 dias $\Rightarrow$ 11,2 kW



ATIVIDADES PROPOSTAS

01

a) $(x + 4)(x + 5) = x(x - 3)$
 $x^2 + 5x + 4x + 20 = x^2 - 3x$
 $12x = -20$
 $x = \frac{-5}{3}$

b) $\frac{x}{(x-1)} \cdot \frac{7}{(x+1)} = \frac{x}{(x+2)} \cdot \frac{7}{(x-3)}$
 $x^2 - x - 6 = x^2 - 1$
 $x = -5$

02 A

- I. Nível global $\Rightarrow$ 1,7 cm por década
 5 décadas $\Rightarrow$ 8,5 cm
- II. Nível global $\Rightarrow$ 3,1 cm por década
 5 décadas $\Rightarrow$ 15,5 cm

03 C

$$1 \text{ passo} \Rightarrow 10 \text{ reais}$$

$$2 \text{ passos} \Rightarrow 20 \text{ reais}$$

$$30 \text{ m} = 3000 \text{ cm}$$

$$\frac{3000}{50} = 60 \text{ passos}$$

$$60 \cdot 10 = 600 \text{ reais}$$

04 D

$$1 \text{ suco} \xrightarrow{\times 6} 6 \text{ L}$$

$$3 \text{ águas} \xrightarrow{\times 6} 18 \text{ L}$$

$$4 \text{ (mistura)} \xrightarrow{\times 6} 24 \text{ L}$$

$$2 \text{ sucos} \xrightarrow{\times 3} 6 \text{ L}$$

$$5 \text{ águas} \xrightarrow{\times 3} 15 \text{ L}$$

$$7 \text{ (mistura)} \longrightarrow 21 \text{ L}$$

05 E

- 20 canetas em A $\Rightarrow$ Pagará o preço de 16 canetas, pois $20 = 4 \cdot 5$, e a cada cinco canetas, ela paga o preço de apenas quatro. Ela gastará $16 \cdot 3 = 48$ reais.
- 20 canetas em B $\Rightarrow$ A cada 7 canetas, ela paga o preço de 5. Então, $7 + 7 + 6$ canetas saem pelo preço de $3 \cdot 5 = 15$ canetas. Ela gastará $15 \cdot 4 = 60$ reais. Entre a opção mais cara e a mais barata, Joana economiza $60 - 48 = 12$ reais.

06 C

$$V = \frac{40 \text{ km}}{60 \text{ min}} = \frac{2}{3} \text{ km/min} \quad V = \frac{45 \text{ km}}{60 \text{ min}} = \frac{3}{4} \text{ km/min}$$

$$t = x + 1 \quad t = x - 1$$

$$\frac{2}{3}(x+1) = \frac{3}{4}(x-1) \quad D = \frac{2}{3}(x+1)$$

$$9(x-1) = 8(x+1) \quad D = \frac{2}{3} \cdot 18$$

$$9x - 9 = 8x + 8 \quad D = 12 \text{ km}$$

$$x = 17$$

07 C

$$\begin{cases} \text{Filha} = 4k \\ \text{Filho} = 3k \end{cases} \quad \begin{cases} \text{Filha} + \text{Filho} = \frac{x}{2} \\ 4k + 3k = \frac{x}{2} \end{cases}$$

$$\begin{cases} \text{Viúva} = 6k \\ \text{Segurança} = 500 \end{cases} \quad \begin{cases} x = 14k \\ x = 7000 \end{cases}$$

$$k = 500$$

Aula 27

Grandezas proporcionais, regra de três, porcentagem e juros I

ATIVIDADES PARA SALA

01

$$\begin{cases} a + b + c = 312 \\ \frac{a}{4} = \frac{b}{9} = \frac{c}{11} = \frac{312}{24} = \frac{13}{1} \end{cases}$$

$$a = 52; b = 117; c = 143$$

02 B

$$\begin{cases} a + b + c + d = 16 \\ \frac{a}{4} = \frac{b}{4} = \frac{c}{3} = \frac{d}{3} = \frac{42}{14} = \frac{3}{1} \end{cases} \quad \begin{cases} a = 12 \\ b = 12 \\ c = 9 \\ d = 9 \end{cases}$$

03

$$\begin{array}{r} 2800 \text{ ————— } 7 \text{ dias} \\ x \text{ ————— } 4 \text{ dias} \\ \hline \frac{2800}{x} = \frac{7}{4} \quad x = 1600 \text{ tijolos.} \end{array}$$

04

$$\begin{cases} a + b + c = 1725 \\ \frac{a}{5} = \frac{b}{8} = \frac{c}{4} = \frac{a+b+c}{8+5+10} = \frac{1725}{23} = 1725 \cdot \frac{40}{23} = 75 \cdot 40 = 3000 \end{cases}$$

$$a = \frac{1}{5} \cdot 3000 = 600; b = \frac{1}{8} \cdot 3000 = 375; c = \frac{1}{4} \cdot 3000 = 750$$

Portanto, Abel recebeu R\$600,00, Benício, R\$375,00, e Carlinhos, R\$750,00.

05 C

$$\frac{40}{100} = \frac{2}{5}$$



ATIVIDADES PROPOSTAS

01 E

O preço era R\$ 50,00, que com 20% de desconto, passa a ser R\$ 40,00. Com desconto de 10%, passa a ser R\$ 36,00, ou seja, houve uma economia de R\$ 4,00.

02 D

$$853 \text{ ————— } 100\%$$

$$80 \text{ ————— } x$$

$$853x = 8000$$

$$x = 9,37$$

$$x = 9,4\%$$

03 C

Volume	Horas	Ralos
$\frac{900}{500} \downarrow$	$\frac{6}{4} \uparrow$	$\frac{6}{x} \downarrow$

$$\frac{6}{x} = \frac{4}{5} \cdot \frac{9}{3} \therefore \frac{6}{x} = \frac{12}{10} \Rightarrow x = 5 \text{ ralos}$$

04 D

$$\frac{107 \text{ bilhões}}{441 \text{ bilhões}} = 0,243 = 24\%$$

05 A

$\frac{10 \text{ min}}{x} \downarrow$	$\frac{27 \text{ secretárias}}{50} \uparrow$	$\frac{324 \text{ páginas}}{600} \downarrow$
---------------------------------------	--	--

$$\frac{10}{x} = \frac{50}{27} \cdot \frac{324}{600} \therefore \frac{10}{x} = \frac{12}{12} \therefore x = 10 \text{ min}$$

06 A

$\frac{120}{x} \downarrow$	$\frac{20}{50} \downarrow$	$\frac{10}{20} \downarrow$	$\frac{3}{4} \downarrow$
----------------------------	----------------------------	----------------------------	--------------------------

$$\frac{120}{x} = \frac{2}{5} \cdot \frac{1}{2} \cdot \frac{3}{4}$$

$$\frac{120}{x} = \frac{3}{20} \Rightarrow 3x = 2400$$

$$x = 800$$

Essa quantidade foi arrecadada nos 20 dias finais. Como, nos 10 dias iniciais, houve 120 kg arrecadados, o total foi de 920 kg.

07

$$M + J = 93$$

$$\frac{M}{30000} = \frac{J}{32000} = \frac{M+J}{62000} = \frac{93}{62000}$$

$$\frac{M}{30000} = \frac{93}{62000}$$

$$62M = 2790$$

$$M = 45$$

$$J = 93 - 45 \therefore J = 48$$

Aula 28

Grandezas proporcionais, regra de três, porcentagem e juros II

ATIVIDADES PARA SALA



ATIVIDADES PROPOSTAS

01 C

$$\begin{array}{r} 60,52\% \\ - 3,57\% \\ \hline 56,95\% \end{array}$$

02 Telhas Tijolos

$$\begin{array}{l} 1500 \text{ ————— } 1200 \\ 600 \text{ ————— } x \\ \frac{1200}{x} = \frac{15}{6} \therefore \frac{1200}{x} = \frac{5}{2} \\ 5x = 2400 \therefore x = 480 \end{array}$$

03 A

$$\begin{aligned} P + F + O &= 19200 \\ \frac{P}{36000} &= \frac{F}{45000} = \frac{O}{63000} = \frac{P + F + O}{36000 + 45000 + 63000} = \\ &= \frac{19200}{144000} = \frac{2}{15} \\ \frac{P}{36000} &= \frac{2}{15} \Rightarrow 15P = 72000 \\ P &= 4800 \\ \frac{F}{45000} &= \frac{2}{15} \Rightarrow 15F = 90000 \\ F &= 6000 \\ O &= 19200 - (4800 + 6000) \\ O &= 19200 - 10800 \\ O &= 8400 \end{aligned}$$

04 C

$$\begin{array}{l} 132000 \longrightarrow 145000 \\ \text{Aumentou } 13000, \text{ ou seja:} \\ \frac{13000}{132000} = 0,098 = 9,8\% \end{array}$$

De acordo com o resultado, o desempenho da empresa no ano de 2015 deve ser considerado bom.

05 $70,90 = \frac{C \cdot 4 \cdot 5}{100}$

$$20C = 7090$$

$$C = \frac{7090}{20} \therefore C = 354,50$$

01 C

$$\begin{aligned} \frac{1,90}{2,38} &= 0,79 \approx 0,80 \\ 1,90 \cdot 0,80 &= 1,52 \end{aligned}$$

02 B

$$\begin{cases} \frac{C}{1} = \frac{A}{4} = \frac{B}{2} = \frac{C + A + B}{1 + 4 + 2} = \frac{14}{7} = 2 \\ C + A + B = 14 \end{cases}$$

03 J

$$\begin{aligned} J &= \frac{500000 \cdot 4,2 \cdot 3,5}{100} \\ J &= 500 \cdot 4,2 \cdot 3,5 \\ J &= 7350,00 \end{aligned}$$

04 15 120 =

$$\begin{aligned} 15120 &= \frac{900000 \cdot i \cdot 6}{100} \\ 5400 = i &= 15120 \\ i &= 2,8\% \text{ a.m.} \end{aligned}$$

05 C

$$\begin{aligned} 28\% + 17\% &= 45\% \\ \frac{360}{x} &= \frac{100}{45} \cdot 20 \\ 20x &= 360 \cdot 9 \\ x &= 162^\circ \end{aligned}$$

Assim, o ângulo central é classificado como obtuso.

06 a + b = 216

$$\begin{aligned} \frac{a}{1} \cdot 5 &= \frac{b}{3} \cdot 6 \Rightarrow \frac{5a}{1} = \frac{6b}{3} \\ 10a &= \frac{24b}{3} \Rightarrow 10a = 8b \Rightarrow 5a = 4b \end{aligned}$$

$$\begin{aligned} \text{Tem-se: } \begin{cases} a + b = 216 \cdot (4) \\ 5a - 4b = 0 \end{cases} &\Rightarrow \begin{cases} 4a + 4b = 864 \\ 5a - 4b = 0 \end{cases} \\ 9a &= 864 \therefore a = 96 \Rightarrow b = 120 \end{aligned}$$

Resposta: 96 e 120.

07

Horas/dia	Peças	Dias
$\frac{4}{5}$	750	5
$\frac{1}{x}$	1500	x

$$\frac{5}{x} = \frac{5}{4} \cdot \frac{1}{2} \therefore \frac{5}{x} = \frac{5}{8} \therefore x = 8 \text{ dias}$$

Aula 29

Grandezas proporcionais, regra de três, porcentagem e juros III

ATIVIDADES PARA SALA

01 $979,60 = \frac{15800 \cdot 2 \cdot t}{100}$

$316t = 979,60$

$t = 3,1$ meses = 3 meses e 3 dias

02
$$\begin{cases} x + y = 13818 \\ \frac{x}{19} = \frac{y}{23} = \frac{x+y}{19+23} = \frac{13818}{42} = 329 \end{cases}$$

$x = 19 \cdot 329 = R\$6251,00$

$y = 23 \cdot 329 = R\$7567,00$

03 E

Trabalhadores	horas/dia	Dias	Produtividade
$\frac{50}{40} \uparrow$	$\frac{8}{10} \uparrow$	$\frac{28}{x} \downarrow$	$\frac{1,0}{0,8} \uparrow$

$\frac{7 \cdot 28}{x} = \frac{4}{5} \cdot \frac{5}{4} \cdot \frac{4}{5} \cdot \frac{7}{x} = \frac{1}{5} \therefore x = 35$

04 E

Muro (m ²)	Dias	Pedreiros
$\frac{4120}{9270} \downarrow$	$\frac{2}{3} \uparrow$	$\frac{6}{x} \downarrow$

$\frac{6}{x} = \frac{2}{9} \cdot \frac{3}{2} \therefore \frac{6}{x} = \frac{6}{9} \therefore x = 9$

05 E

$7,2 \text{ milhões} = \frac{7200000 \text{ litros}}{32000 \text{ litros}} = 225$

$32 \text{ m}^3 = 32000$

ATIVIDADES PROPOSTAS

01 B

Lucro: $34000 - 26000 = 8000$

15% de $8000 = 1200$

02 C

O cubo de aresta a sofreu uma redução de 20%, ou seja, de $\frac{20}{100} a = 0,2a$, ficando com uma aresta de $0,8a$.

Volume após redução: $V = (0,8a)^3 = 0,512a^3$.

Então: $a^3 - 0,512a^3 = 0,488a^3 = 48,8\%$.

03
$$\begin{array}{ccc} 2,1 \downarrow & \frac{7}{7} \downarrow & 100 \downarrow \\ x & \frac{5}{7} & 120 \end{array}$$

$\frac{2,1}{x} = \frac{7}{5} \cdot \frac{5}{6} \Rightarrow \frac{0,3}{x} = \frac{1}{6}$

$\therefore x = 1,8$ tonelada

04
$$7830 = \frac{C \cdot 36 \cdot \frac{16}{12}}{100}$$

$36 \cdot \frac{16}{12} C = 783000$

$48C = 783000$

$C = R\$16312,50$

05 Preço: X

Preço para venda: $1,20x$

Preço de um produto remarcado errado: $0,80x$

$\frac{0,80x}{1,20x} = \frac{80}{120} = \frac{2}{3} = 0,666 \approx 66,7\%$

Logo, o prejuízo foi de: $100\% - 66,7\% = 33,3\%$

06 C

Analisando cada ano:

a) (F) $1200 - 1070 = 130 \Rightarrow 130 : 1200 = 10,8\%$ (diminuiu)

b) (F) $1380 - 1200 = 180 \Rightarrow 180 : 1200 = 15\%$ (aumentou)

c) (V) $1560 - 1200 = 360 \Rightarrow 360 : 1200 = 30\%$ (aumentou)

d) (F) $1500 - 1200 = 300 \Rightarrow 300 : 1200 = \frac{1}{4} = 25\%$ (aumentou)

e) (F) $1700 - 1200 = 500 \Rightarrow 500 : 1200 = \frac{5}{12} = 41,6\%$ (aumentou)

07 B

A semana sem sábado e domingo possui 5 dias, logo:

Semana	Idade
$\frac{5}{7} \downarrow$	$\frac{45}{x} \downarrow$

$\frac{5}{7} = \frac{45}{x} \cdot \frac{7}{5}$

$x = 63$ anos

Assim: $2015 - 63 = 1952$.

Aula 30

Revisão II

01 E

68,210

68,102

68,001

68,020

68,012

02 B

Por meio da leitura do gráfico, é possível perceber que o ponto correspondente à abscissa 3 é a ordenada 12. Portanto, conclui-se que a quantidade de medicamento que permanece no fim do terceiro dia é de 12 mg.

03 D

Na última parte do gráfico, verifica-se a velocidade:

$$V = \frac{2000 - 1700}{60 - 50} = \frac{300}{10} = 30 \text{ pessoas/min.}$$

Então, $1860 - 1700 = 160$ pessoas entraram após os 50 minutos, com o tempo gasto: $\frac{160}{30} \cdot 60 = 320 \text{ s} \Rightarrow 5 \text{ minutos e } 20 \text{ segundos.}$

04 D

$$V = \frac{D}{t} \therefore 90 = \frac{18}{t} \Rightarrow t = \frac{18}{90} = \frac{1}{5} \text{ h} \Rightarrow t = 12 \text{ minutos}$$

05 B

8 quadros ($25 \text{ cm} \times 50 \text{ cm}$)

$$\text{Área} = 25 \cdot 50 \cdot 8 = 10000 \text{ cm}^2 = 1 \text{ m}^2$$

$$\text{Moldura} = (50 \cdot 2 + 25 \cdot 2) \cdot 8 = 1200 \text{ cm} = 12 \text{ m}$$

$$\text{Valor a pagar} = 20 \cdot 1 + 15 \cdot 12 + 10 = \text{R\$ } 210,00$$

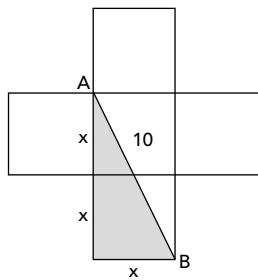
8 quadros ($50 \text{ cm} \times 100 \text{ cm}$)

$$\text{Área} = 50 \cdot 100 \cdot 8 = 40000 \text{ cm}^2 = 4 \text{ m}^2$$

$$\text{Moldura} = (2 \cdot 50 + 2 \cdot 100) \cdot 8 = 2400 = 24 \text{ m}$$

$$\text{Valor a pagar} = 20 \cdot 4 + 15 \cdot 24 + 10 = \text{R\$ } 450,00$$

06



$$(2x)^2 + x^2 = 10^2$$

$$5x^2 = 100$$

$$x^2 = 20 \text{ m cada quadrado}$$

$$A_{\text{jardim}} = 5 \cdot 20 = 100 \text{ m}^2 = 1 \text{ dam}^2$$

07 C

$$\frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{4}{8}, \dots, 10$$

Há, então, 80 números. Observe que:

$$\frac{1}{8} \xrightarrow{3s} \frac{2}{8} \xrightarrow{3s} \frac{3}{8} \dots \xrightarrow{3s} \frac{80}{8}$$

$$\text{Tempo} = 79 \cdot 3 = 237 \text{ segundos.}$$

08 C

$$2,5 \cdot 5 = 12,5 \text{ cm}$$

$$156,5 - 12,5 = 144 \text{ cm}$$

$$144 : 6 = 24 \text{ cm}$$

09 D

$$1 \text{ pol} = 25 \text{ mm} = 0,025 \text{ m}$$

$$\text{Número de tubos} = \frac{1,20}{0,025} = 48$$

10

$$\frac{3}{8} \cdot 120 \text{ cm} = 45 \text{ cm}$$

$$\text{Resposta: } 1,2 + 0,45 + 0,45 = 2,1 \text{ m}$$

11 B

$$6,05 \text{ hm} + 0,72 \text{ km} + 12500 \text{ cm}$$

$$605 + 720 + 125 = 1450 \text{ m}$$

12 D

$$1430,00 : 22 = 65$$

$$1 \text{ m} - 2 \text{ cm} = 0,98 \text{ m} \cdot 22 = 21,56$$

$$\text{Deixou de vender } 22 - 21,56 = 0,44 \text{ m}$$

$$1 \text{ m} \text{ — } 65 \text{ reais}$$

$$0,44 \text{ — } 65 \cdot 0,44 = 28,60$$

13

$$V = 5 \cdot 2,5 \cdot 4 = 50 \text{ m}^3 = 50000 \text{ L}$$

$$\text{Torneiras} = (900 \text{ L} + 2080 \text{ L}) \Rightarrow \text{Em 1 hora} = 2980 \text{ L.}$$

$$\text{Escape} = 8 \text{ L/min} \Rightarrow \text{Em 1 hora} = 480 \text{ L.}$$

A cada hora, as torneiras despejam 2980 L, e o escape elimina 480 L de água, ficando na caixa de água 2500 L. Logo, em $50000 : 2500 = 20$ horas a caixa ficará cheia.

14

$$V_{\text{óleo}} = 13 \cdot 8 \cdot 4 = 416 \text{ m}^3 = 416000 \text{ litros}$$

$$V_{\text{lata}} = 0,10 \cdot 0,08 \cdot 0,26$$

$$= 0,00208 \text{ m}^3$$

$$= 2,08 \text{ litros}$$

$$N^{\circ} \text{ de latas} = \frac{416000}{2,08} = 200000 \text{ latas}$$

$$\text{Valor} = 200000 \cdot 17,50 = 3500000,00$$

15

$$A = 486 \cdot 45 = 21870 \text{ m}^2$$

$$A = 2,1870 \text{ hm}^2 = 2,1870 \text{ ha}$$

$$800 \text{ daL} = 8000 \text{ L}$$

$$\text{Feijão} = 2,187 \cdot 8000$$

$$= 17496 \text{ L}$$

$$\text{Valor} = 17496 \cdot 5$$

$$= \text{R\$ } 87480,00$$

16 $V_{\text{óleo}} = 75 \cdot 20^3$
 $= 75 \cdot 8000 \text{ cm}^3$
 $= 75 \cdot 0,008 \text{ m}^3$
 $= 0,6 \text{ m}^3$

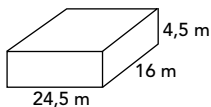
$V_{\text{óleo}} = 4 \cdot 2 \cdot \frac{3}{5} h$
 $0,6 = \frac{24 h}{5}$
 $24 h = 3 \therefore h = 0,125 \text{ m}$

17 $V_{\text{água}} = 2 \cdot 1,5 \cdot 0,133$
 $= 0,399 \text{ m}^3$
 $= 399 \text{ L}$

18 A
 150 g p/semana
 120 kg = 120000 g
 Ao iniciar a 4ª semana: $120000 - 450 = 119 \cdot 550 \text{ g} =$
 $= 119,55 \text{ kg}$

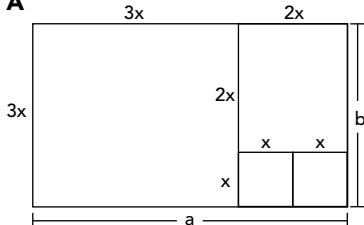
19 C
 $8 \cdot 60 \text{ kg} = 480 \text{ kg} = 2^5 \cdot 3 \cdot 5$
 $8 \cdot 64 \text{ kg} = 576 \text{ kg} = 2^6 \cdot 3^2$
 $6 \cdot 72 \text{ kg} = 432 \text{ kg} = 2^4 \cdot 3^3$
 $\overline{24 \cdot 3 = 48 \text{ kg}}$
 $n = (480 + 576 + 432) : 48$
 $n = 1488 \text{ kg} : 48 \text{ kg} = 31$

20 A



$V = 24,5 \cdot 16 \cdot 4,5$
 $V = 1764 \text{ m}^3 = 1764000 \text{ L}$
 $V_{\text{Leite}} = \frac{3}{5} \cdot 1764000 \text{ L} = 1058400 \text{ L}$
 $V_{\text{Leite}} = 1058400 \text{ L} \cdot 1,020 \text{ kg}$
 $V_{\text{Leite}} = 1079568 \text{ kg} = 1079,568 \text{ toneladas}$

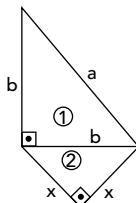
21 A



$a = 5x$ $b = 3x$

Logo, $\frac{a}{b} = \frac{5x}{3x} = \frac{5}{3}$.

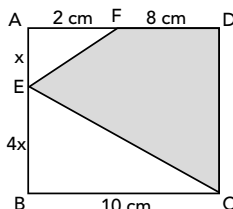
22 C



$A_1 = \frac{b \cdot b}{2} = \frac{b^2}{2} = \frac{x^2}{2} = x^2$
 $A_2 = \frac{x^2}{2}$
 $b^2 = x^2 + x^2$
 $b^2 = 2x^2$
 $b = x\sqrt{2}$

$\frac{A_1}{A_2} = \frac{x^2}{\frac{x^2}{2}} = 2$

23 A



$A_{\triangle AEF} = \frac{2 \cdot 2}{2} = 2 \text{ cm}^2$
 $A_{\triangle EBC} = \frac{10 \cdot 8}{2} = 40 \text{ cm}^2$
 $A_{\text{sombreada}} = 100 - (40 + 2)$
 $A_{\text{sombreada}} = 100 - 42 = 58 \text{ cm}^2$

$5x = 10$
 $x = 2 \text{ cm}$

24 $\begin{cases} a^2 + b^2 = 585 \Rightarrow \frac{16b^2}{49} = b^2 + 585 \Rightarrow 16b^2 + 49b^2 = 28665 \\ \frac{a}{b} = \frac{4}{7} \end{cases}$

$65b^2 = 28665$
 $b^2 = \frac{28665}{65}$
 $b^2 = 441 \therefore b = 21$
 $a^2 = 585 - 441$
 $a^2 = 144 \therefore a = 12$

Os números são 12 e 21.

25 B

Digitadores	horas/dia	Produção	Dias
8	6	$\frac{3}{5}$	15
6	5	$\frac{2}{5}$	x

$\frac{15}{x} = \frac{3}{2} \cdot \frac{5}{2} \cdot \frac{1}{4} \therefore \frac{15}{x} = \frac{15}{16}$
 $x = 16$

26 $2C = \frac{C \cdot 4 \cdot t}{100}$
 $4t \cdot \cancel{C} = 200 \cdot \cancel{C}$
 $4t = 200 \Rightarrow t = 50 \text{ anos}$

27 C

$$1296 - C = \frac{C \cdot 8 \cdot 1}{100}$$

$$8C = 129600 - 100C$$

$$108C = 129600$$

$$C = R\$ 1200,00$$

28 A

$$\frac{3}{5}C \quad \frac{2}{5}C$$

$$12\% \text{ a.a.} \quad 18\% \text{ a.a.}$$

$$t = 8 \text{ meses} = \frac{2}{3} \text{ ano} \quad t = 8 \text{ meses} = \frac{2}{3} \text{ ano}$$

$$\frac{3}{5}C \cdot 12 \cdot \frac{2}{3} + \frac{2C}{5} \cdot 18 \cdot \frac{2}{3} = 172800$$

$$\frac{24C}{5} + \frac{24C}{5} = 172800 \therefore \frac{48C}{5} = \frac{3600}{1}$$

$$\frac{C}{5} = 3600 \therefore C = 18000$$

29 D

$$\text{Área}_{\text{página do jornal}} = 400 \cdot 260 = 104000 \text{ mm}^2$$

$$4\% \text{ de } 104000 \text{ mm}^2 = 4160 \text{ mm}^2$$

$$\text{Logo, } 26 \cdot x = 4160$$

$$x = 160 \text{ mm}$$

30

$$\begin{array}{r} 1236,02 \\ -1074,80 \\ \hline 161,22 \end{array} \quad \frac{161,22}{1074,80} = 0,15 = 15\%$$

31

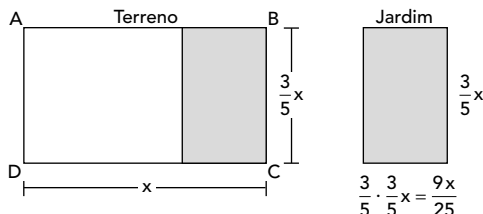
$$\frac{2x}{2 \cdot 3} = \frac{3y}{3 \cdot 4} = \frac{5z}{5 \cdot 6} = \frac{7w}{7 \cdot 9} = \frac{2x-3y-5z+7w}{6-12-30+63} = \frac{999}{27} = 37$$

$$\frac{x}{3} = 37 \Rightarrow x = 111 \quad \frac{y}{4} = 37 \Rightarrow 148 \quad \frac{z}{6} = 37 \Rightarrow z = 222 \quad \frac{w}{9} = 37 \Rightarrow w = 333$$

$$\text{Assim:}$$

$$7 \cdot (w - z + y + x - 82) = 7 \cdot (333 - 222 + 148 + 111 - 82) = 7288 = 2016$$

32 B



$$A_{\text{Terreno}} = \frac{3}{5}x \cdot x = \frac{3x^2}{5}$$

$$A_{\text{Jardim}} = \frac{3}{5}x \cdot \frac{9x}{25} = \frac{27x^2}{125}$$

$$\text{Razão} = \frac{\frac{27x^2}{125}}{\frac{3x^2}{5}} = \frac{27x^2}{125} \cdot \frac{5}{3x^2} = \frac{9}{25} = \frac{36}{100} = 36\%$$

$$\text{Razão} = \frac{9}{25} = \frac{36}{100} = 36\%$$

33

$$\frac{x}{y} = \frac{3}{4} \Rightarrow \begin{cases} x = 3k \\ y = 4k \end{cases}$$

$$x + y = 28$$

$$3k + 4k = 28$$

$$7k = 28$$

$$k = 4$$

$$x = 12$$

$$y = 16$$

Então:

$$\begin{cases} a + b = 175 \\ \frac{a}{12} = \frac{b}{16} = \frac{a+b}{4+3} = \frac{175}{7} = 175 \cdot \frac{48}{7} = 1200 \end{cases}$$

$$\frac{a}{12} = \frac{b}{16} = \frac{a+b}{4+3} = \frac{175}{7} = 175 \cdot \frac{48}{7} = 1200$$

$$\frac{a}{12} = 1200 \therefore a = 100$$

Resposta: R\$ 100,00

34

$$\text{Conta apresentada} = 110\% \cdot (8 + b) = 1,1(8 + b)$$

$$\text{Valor pago: } 8 + 1,1b$$

$$\text{Diferença: } 1,1(8 + b) - (8 + 1,1b)$$

$$8,8 + 1,1b - 8 - 1,1b = 0,8$$

Resposta: = R\$ 0,80

35 D

$$\text{Em 1995} \rightarrow \text{Déficit} = 49858$$

$$-46506$$

$$3352$$

$$\text{Em 1997} \rightarrow \text{Déficit} = 61347$$

$$-52990$$

$$8357$$

$$\text{Logo: } 8357 - 3352 = 5005; \frac{5005}{3352} \approx 1,49 \approx 150\%$$

36 E

Supondo que a parcela seja R\$ 100,00:

$$1^{\text{a}} \text{ parcela} \rightarrow 20\% \text{ de } 100 = 20 \rightarrow \text{Pago: R\$ 80,00}$$

$$2^{\text{a}} \text{ parcela} \rightarrow 30\% \text{ de } 100 = 30 \rightarrow \text{Pago: R\$ 130,00}$$

$$80 \xrightarrow{50} 130$$

$$\frac{50}{80} = 62,5\%$$

37 E

$$30\% \text{ de } 3000 = 900 \Rightarrow 2100$$

$$40\% \text{ de } 900 = 360 \Rightarrow 2460$$

$$3000 \xrightarrow{-540} 2460$$

$$\text{Prejuízo} = \frac{540}{3000} = 0,18 = 18\%$$

38 C

$$\begin{cases} o + p + b = 40 \\ \frac{o}{2} = \frac{p}{3} = \frac{b}{5} = \frac{o+p+b}{2+3+5} = \frac{40}{10} = 4 \end{cases}$$

$$o = 8$$

$$p = 12$$

$$b = 20$$

39 C

Ao passar pela 13ª bandeirinha, ele percorreu apenas 12 bandeirinhas:

$$12 \text{ ————— } 13 \text{ seg}$$

$$19 \text{ ————— } x \quad 12x = 247 \therefore 20,58 \text{ segundos}$$

40 I. E

$$A \xrightarrow[\frac{v}{x}]{\frac{v}{3}} B \xrightarrow[2x]{\frac{v}{3}} C$$

$$\text{Velocidade de A até B} \Rightarrow V = \frac{x}{T} \therefore x = VT$$

$$\text{Velocidade de B até C} \Rightarrow \frac{V}{3} = \frac{2x}{y} \therefore$$

$$\text{Comparando, tem-se: } \frac{\cancel{V}}{3} = \frac{2\cancel{V}T}{y}$$

$$\text{Tempo da triagem de B a C} \Rightarrow y = 6T$$

II. E

$$20\% \cdot 40 = \frac{20}{100} \cdot 40 = 8$$

$$40\% \cdot 40 = \frac{40}{100} \cdot 40 = 16$$