Resoluções

Capítulo 3

Trigonometria no triângulo retângulo

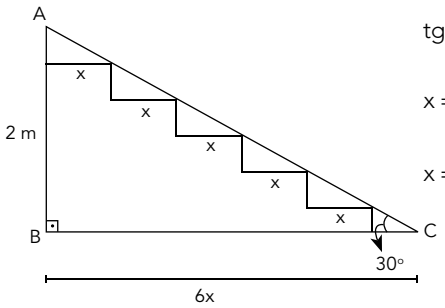
ATIVIDADES PARA SALA

01 a) $\cos 28° = \frac{x}{4} = 0,88 \Rightarrow x = 3,52$

b) $\text{sen } 28° = \frac{2x}{6} = 0,46 \Rightarrow x = 1,38$

c) $\text{tg } 28° = \frac{x+1}{12} = 0,53 \Rightarrow x = 5,36$

02 **E**

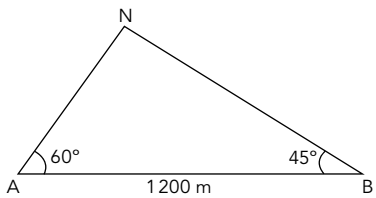


$\text{tg } 30° = \frac{2}{6x} = \frac{\sqrt{3}}{3}$

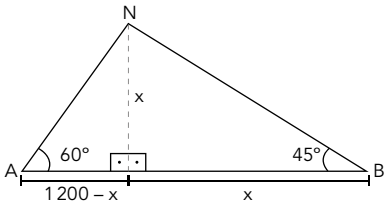
$x = \frac{6}{6\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$x = \frac{\sqrt{3}}{3}$ m

03 a)



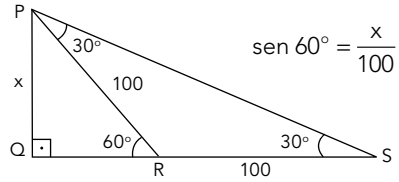
b)



$\text{tg } 60° = \frac{x}{1\,200 - x} = \sqrt{3} \Rightarrow x = 1\,200\sqrt{3} - x\sqrt{3} \Rightarrow$

$\Rightarrow x\left(1+\sqrt{3}\right) = 1\,200\sqrt{3} \Rightarrow x = \frac{1\,200\sqrt{3}}{1+\sqrt{3}}$ m

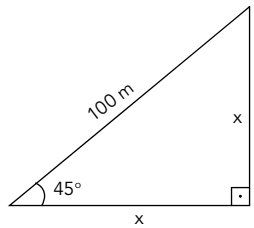
04 **B**



$\text{sen } 60° = \frac{x}{100} = \frac{\sqrt{3}}{2} \Rightarrow x = 50\sqrt{3}$ m

05

I.



$\frac{x}{100} = \text{sen } 45° \Rightarrow \frac{x}{100} = \frac{\sqrt{2}}{2} \Rightarrow$

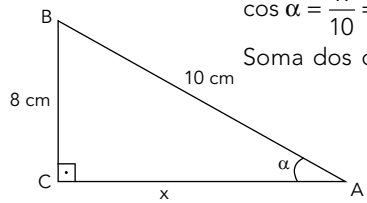
$x = 50\sqrt{2}$ m

II. a) $\text{sen } 74° = \frac{h}{8} = 0,961 \Rightarrow h = 7,688$ cm

b) $\cos 74° = \frac{\frac{x}{2}}{8} = 0,276 \Rightarrow x = 4,416$ cm

ATIVIDADES PROPOSTAS

01 I.



$\cos \alpha = \frac{x}{10} = \frac{3}{5} \Rightarrow x = 6$ cm

Soma dos catetos = 6 + 8 = 14 cm

II. **A**

$\text{sen } B = \frac{b}{a}$

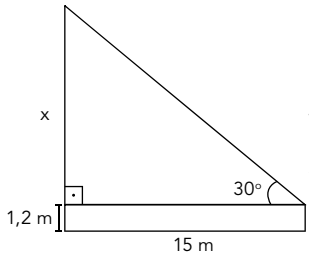
02 **C**

$\text{sen } 30° = \frac{x}{8} = \frac{1}{2} \Rightarrow x = 4$ km

03 **C**

$\cos 60° = \frac{100}{x} = \frac{1}{2} \Rightarrow x = 200$ m

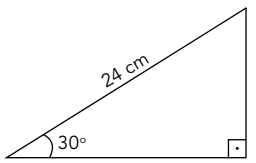
04 **C**



$\text{tg } 30° = \frac{x}{15} = \frac{\sqrt{3}}{3} \Rightarrow x \cong 8,65$

$x + 1,2 \cong 9,85 \text{ m}$

05 **B**



$\text{sen } 30° = \frac{x+4}{24} = \frac{1}{2} \Rightarrow$

$2x = 24 - 8 \Rightarrow x = 8$

Altura do suporte = $x + 3 = 11$ cm

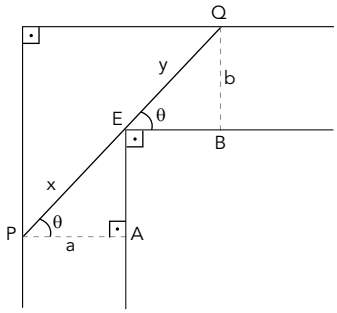
06 **D**

$\text{tg } 60° = \frac{x}{104,03 - 103,5} = \sqrt{3} \Rightarrow x = 0,53 \cdot 1,73 =$

$0,9169 \text{ km} = 916,9 \text{ m}$

07 **E**

Observe a figura.



- Do triângulo APE, tem-se:

$\cos \theta = \frac{a}{x} \Rightarrow x = \frac{a}{\cos \theta} \Rightarrow x = a \cdot \frac{1}{\cos \theta} \Rightarrow$

$\Rightarrow x = a \cdot \sec \theta$

- Do triângulo BEQ, tem-se:

$\text{sen } \theta = \frac{b}{y} \Rightarrow y = \frac{b}{\text{sen } \theta} \Rightarrow y = b \cdot \frac{1}{\text{sen } \theta} \Rightarrow$

$\Rightarrow y = b \cdot \text{cossec } \theta$

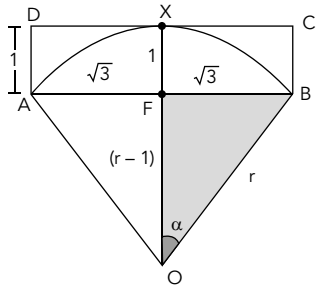
Como $\overline{PQ} = x + y$, então $\overline{PQ} = a \cdot \sec \theta + b \cdot \text{cossec } \theta$.

08 **C**

Lembrando:

- $\overline{DC}$ é tangente do arco, então é perpendicular ao raio.
- $\overline{AB}$ será corda, então F é ponto médio de $\overline{AB}$.

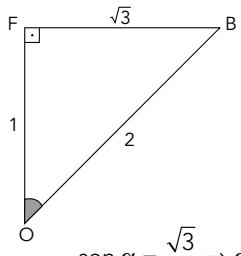
I. Observe a figura.



II. Aplicando o Teorema de Pitágoras, tem-se:

$r^2 = (r-1)^2 + \left(\sqrt{3}\right)^2 \Rightarrow r^2 = r^2 - 2r + 1 + 3 \Rightarrow r = 2$

III. Se r = 2, então tem-se o triângulo:

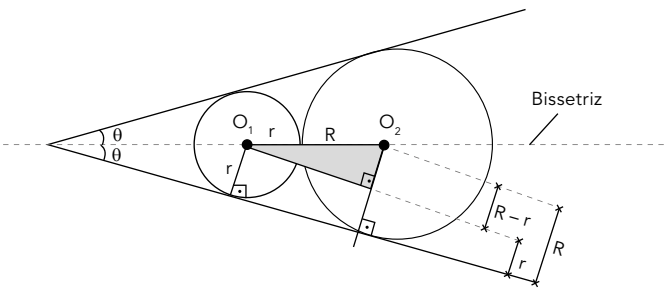


$\text{sen } \alpha = \frac{\sqrt{3}}{2} \Rightarrow \alpha = 60°$

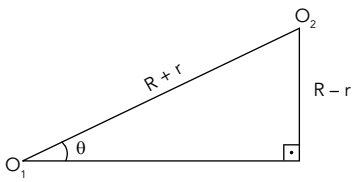
IV. Como o triângulo AOB é isósceles, então $\overline{OF}$ é bissetriz, mediana, altura e mediatriz. Assim, se $\alpha = 60°$, então AOB = 120°. Isso quer dizer que a área do setor circular é $\frac{\pi r^2}{3} = \frac{\pi \cdot 4}{3}$.

09 I. **A**

Representa-se o enunciado da questão pela figura a seguir.

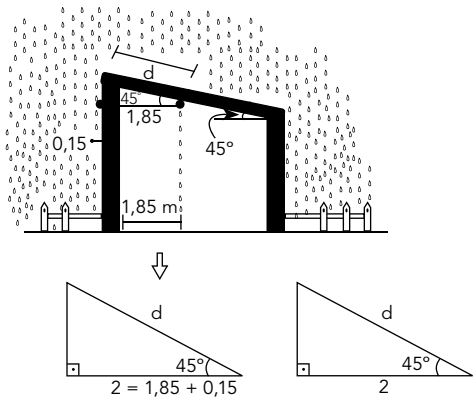


Destacando o triângulo sombreado na figura, tem-se:



$$\text{sen}\,\theta = \frac{R-r}{R+r} \Rightarrow (R+r)\cdot \text{sen}\,\theta = R-r \Rightarrow$$
$$\Rightarrow R\cdot \text{sen}\,\theta + r\cdot \text{sen}\,\theta = R-r \Rightarrow$$
$$\Rightarrow r\cdot \text{sen}\,\theta + r = R - R\,\text{sen}\,\theta \Rightarrow r(\text{sen}\,\theta + 1) = R(1-\text{sen}\,\theta) \Rightarrow$$
$$\Rightarrow r = \frac{R(1-\text{sen}\,\theta)}{1+\text{sen}\,\theta}$$

II. Observe:



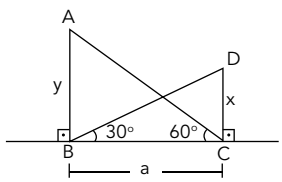
$$\cos 45° = \frac{2}{d}$$
$$\frac{\sqrt{2}}{2} = \frac{2}{d}$$
$$d\sqrt{2} = 4 \Rightarrow\ d = \frac{4}{\sqrt{2}}$$

Portanto:

$$d^2 + 20 = \left(\frac{4}{\sqrt{2}}\right)^2 + 20 = \frac{16}{2} + 20 = 28\ \text{m}$$

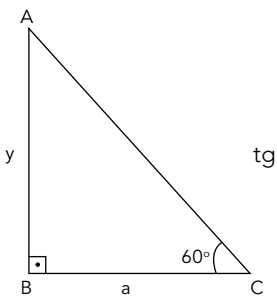
10 **D**

Tem-se a figura a seguir.



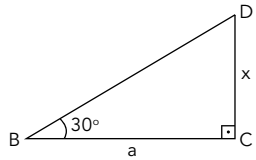
Chamando o lado $\overline{BC}$ (que é comum aos dois triângulos) de **a**, tem-se:

I.



$$\text{tg}\,60° = \frac{y}{a} \Rightarrow a = \frac{y}{\sqrt{3}}$$

II.



$$\text{tg}\,30° = \frac{x}{a} \Rightarrow \frac{\sqrt{3}}{3} = \frac{x}{a} \Rightarrow a = \frac{3x}{\sqrt{3}}$$

III. Igualando as expressões I e II, tem-se:

$$\frac{y}{\sqrt{3}} = \frac{3x}{\sqrt{3}} \Rightarrow y = 3x$$

IV. Se $y - x = 4\sqrt{3}$, então $3x - x = 4\sqrt{3} \Rightarrow 2x = 4\sqrt{3} \Rightarrow$
$\Rightarrow x = 2\sqrt{3}$
$y = 6\sqrt{3}$

V. Assim, $x + y = 6\sqrt{3} + 2\sqrt{3} = 8\sqrt{3}$.