

## 11º ANO | PROPOSTA RESOLUÇÃO MINITESTE 1 | 2022

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1.

$$\bullet 3 \cos(90^\circ - \alpha) - \sqrt{5} = 0 \Leftrightarrow 3 \cos(90^\circ - \alpha) = \sqrt{5} \Leftrightarrow \cos(90^\circ - \alpha) = \frac{\sqrt{5}}{3} \Leftrightarrow \sin \alpha = \frac{\sqrt{5}}{3}$$

$$\bullet \sin^2 \alpha + \cos^2 \alpha = 1$$

$$\left(\frac{\sqrt{5}}{3}\right)^2 + \cos^2 \alpha = 1 \Leftrightarrow \frac{5}{9} + \cos^2 \alpha = 1 \Leftrightarrow \cos^2 \alpha = \frac{9}{9} - \frac{5}{9}$$

$$\Leftrightarrow \cos^2 \alpha = \frac{4}{9} \Leftrightarrow \cos \alpha = \pm \frac{2}{3}, \text{ como } \alpha \in ]0, 90^\circ[, \cos \alpha > 0, \text{ portanto, } \cos \alpha = \frac{2}{3}$$

$$\bullet \tan \alpha = \frac{\sin \alpha}{\cos \alpha}$$

$$\tan \alpha = \frac{\frac{\sqrt{5}}{3}}{\frac{2}{3}} \Leftrightarrow \tan \alpha = \frac{\sqrt{5}}{2}$$

$$\bullet \sqrt{5} \cos \alpha - 3 \tan \alpha = \sqrt{5} \left(\frac{2}{3}\right) - 3 \left(\frac{\sqrt{5}}{2}\right) = \frac{2\sqrt{5}}{3} - \frac{3\sqrt{5}}{2} = \frac{4\sqrt{5}}{6} - \frac{9\sqrt{5}}{6} = -\frac{5\sqrt{5}}{6}$$

Resposta:  $-\frac{5\sqrt{5}}{6}$

2.

$$\begin{aligned} \frac{\sin^2 10^\circ + \cos^2 10^\circ + \cos^2 45^\circ}{2 \sin 30^\circ - \tan 60^\circ} &= \frac{1 + \left(\frac{\sqrt{2}}{2}\right)^2}{2\left(\frac{1}{2}\right) - \sqrt{3}} = \frac{1 + \frac{1}{2}}{1 - \sqrt{3}} \\ &= \frac{\frac{3}{2}}{1 - \sqrt{3}} = \frac{3}{2} \times \frac{1}{1 - \sqrt{3}} = \frac{3}{2 - 2\sqrt{3}} = \frac{3(2 + 2\sqrt{3})}{2^2 - (2\sqrt{3})^2} \\ &= \frac{6 + 6\sqrt{3}}{4 - 4 \times 3} = \frac{6 + 6\sqrt{3}}{4 - 12} = \frac{6 + 6\sqrt{3}}{-8} = -\frac{3 + 3\sqrt{3}}{4} \end{aligned}$$

Resposta:  $-\frac{3 + 3\sqrt{3}}{4}$

3.

$$\begin{aligned}2 - \left(\frac{1}{\tan^2 \theta} + 1\right)(1 - \cos^2 \theta) &= 1 \\ \Leftrightarrow 2 - \left(\frac{\cos^2 \theta}{\sin^2 \theta} + 1\right)(\sin^2 \theta) &= 1 \\ \Leftrightarrow 2 - \left(\frac{\cos^2 \theta}{\sin^2 \theta} \times \sin^2 \theta + \sin^2 \theta\right) &= 1 \\ \Leftrightarrow 2 - (\cos^2 \theta + \sin^2 \theta) &= 1 \\ \Leftrightarrow 2 - (1) &= 1 \\ \Leftrightarrow 1 = 1 \quad (\text{c.q.p})\end{aligned}$$

4.

Seja  $x = \overline{BD}$  e  $y = \overline{BC}$ , temos que:

$$\begin{aligned}\begin{cases} \tan 41^\circ = \frac{y}{x} \\ \tan 29^\circ = \frac{y}{x+15} \end{cases} &\Leftrightarrow \begin{cases} 0,8693x = y \\ 0,5543(x+15) = y \end{cases} \Leftrightarrow \begin{cases} 0,8693x = y \\ 0,5543x + 8,3145 = y \end{cases} \\ \Leftrightarrow \begin{cases} 0,8693x = y \\ 0,5543x + 8,3145 = 0,8693x \end{cases} &\Leftrightarrow \begin{cases} 0,8693x = y \\ 0,5543x - 0,8693x = -8,3145 \end{cases} \\ \Leftrightarrow \begin{cases} 0,8693x = y \\ 0,315x = 8,3145 \end{cases} &\Leftrightarrow \begin{cases} 0,8693x = y \\ x = 26,3952 \end{cases} \Leftrightarrow \begin{cases} 0,8693 \times 26,3952 = y \\ x = 26,3952 \end{cases} \Leftrightarrow \begin{cases} y = 22,9453 \\ x = 26,3952 \end{cases}\end{aligned}$$

Logo,  $\overline{AB} = 15 + 26,3952 = 41,3952$  e  $\overline{BC} = 22,9453$ .

$$\text{Então, } A_{\Delta[ABC]} = \frac{\overline{AB} \times \overline{BC}}{2} = \frac{41,3952 \times 22,9453}{2} = \frac{949,8253}{2} = 474,9127$$

Resposta: 474,9

5.

Seja  $r \in \mathbb{R}^+$  o raio de cada um dos círculos, temos que  $\overline{AB} = 6r$  e  $\overline{BC} = 2r$ .

Assim, vem que:

$$\tan(\widehat{BAC}) = \frac{\overline{BC}}{\overline{AB}} \Leftrightarrow \tan(\widehat{BAC}) = \frac{2r}{6r} \Leftrightarrow \tan(\widehat{BAC}) = \frac{1}{3}$$

Portanto,  $\widehat{BAC} = \tan^{-1}\left(\frac{1}{3}\right)$ , ou seja,  $\widehat{BAC} \approx 18^\circ$ .

Resposta: **(D)**

**FIM**

PLANO ALPHA