

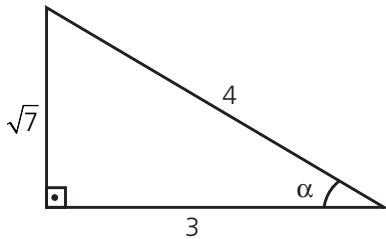
01. Temos:

$$E = \frac{\sin 15^\circ + \sin 20^\circ + \sin 10^\circ}{\cos 15^\circ + \cos 20^\circ + \cos 10^\circ} \Rightarrow E = \frac{\sin 15^\circ + 2\sin 15^\circ \cdot \cos 5^\circ}{\cos 15^\circ + 2\cos 15^\circ \cos 5^\circ} \Rightarrow E = \frac{\sin 15^\circ (1 + 2\cos 5^\circ)}{\cos 15^\circ (1 + 2\cos 5^\circ)} \Rightarrow E = \text{Tg } 15^\circ = \text{Tg } (45^\circ - 30^\circ)$$

$$E = \frac{\text{tg } 45^\circ - \text{tg } 30^\circ}{1 + \text{tg } 45^\circ \cdot \text{tg } 30^\circ} = \frac{1 - \frac{\sqrt{3}}{3}}{1 + \frac{\sqrt{3}}{3}} \Rightarrow E = \frac{3 - \sqrt{3}}{3 + \sqrt{3}} = 2 - \sqrt{3} \approx 0,27$$

Resposta: A

02. Temos que:



i) $\cos \alpha = \frac{3}{4} \rightarrow \sin \alpha = \frac{\sqrt{7}}{4}$

ii) $d = 16 \sin\left(\frac{3\alpha}{2}\right) \cdot \sin\left(\frac{\alpha}{2}\right) \Rightarrow$

$$-d = 8 \cdot \left[-2 \sin\left(\frac{3\alpha}{2}\right) \cdot \sin\left(\frac{\alpha}{2}\right) \right] \Rightarrow$$

$$-d = 8 \cdot \underbrace{\left(\cos 2\alpha - \cos \alpha \right)}_{\text{werner}} \Rightarrow -d = 8 \cdot (\cos^2 \alpha - \sin^2 \alpha - \cos \alpha)$$

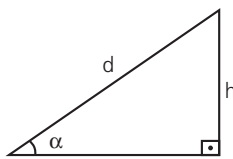
$$\Rightarrow -d = 8 \cdot \left(\frac{9}{16} - \frac{7}{16} - \frac{3}{4} \right) \Rightarrow d = 5$$

iii) Veja:

$$\sin \alpha = \frac{h}{5} = \frac{\sqrt{7}}{4}$$

Logo:

$$h = \frac{5\sqrt{7}}{4} \text{ m}$$



Resposta: C

03. Temos:

$$y = \frac{\cos 3x - \cos x}{\sin x - \sin 3x}$$

Transformando em produto

$$y = \frac{-2 \sin\left(\frac{3x+x}{2}\right) \sin\left(\frac{3x-x}{2}\right)}{2 \sin\left(\frac{x-3x}{2}\right) \cos\left(\frac{x+3x}{2}\right)} \Rightarrow y = \frac{-\sin(2x) \cdot \sin(x)}{\sin(-x) \cdot \cos(2x)} \Rightarrow y = \frac{-\sin(2x) \cdot \sin(x)}{-\sin(x) \cdot \cos(2x)} \Rightarrow y = \text{tg}(2x)$$

Resposta: E

04.

$$\cos \alpha = \frac{y_B}{1} \Leftrightarrow y_B = \cos \alpha$$

$$\sin \alpha = \frac{x_A}{1} \Leftrightarrow x_A = \sin \alpha$$

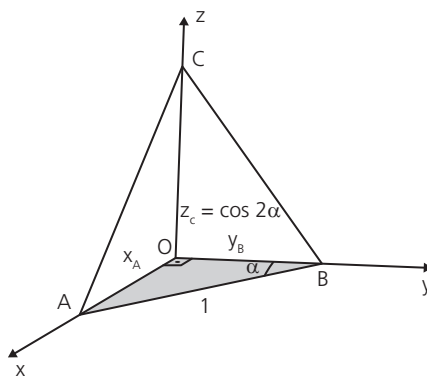
$$V = \frac{1}{3} \cdot \frac{\cos \alpha \cdot \sin \alpha}{2} \times \cos 2\alpha$$

$$V = \frac{1}{3} \cdot \frac{2 \cos \alpha \cdot \sin \alpha}{4} \cdot \cos 2\alpha$$

$$V = \frac{1}{3} \cdot \frac{\sin 2\alpha}{4} \cdot \cos 2\alpha$$

$$V = \frac{1}{3} \cdot \frac{2 \cdot \sin 2\alpha}{8} \cdot \cos 2\alpha$$

$$V = \frac{\sin 4\alpha}{24}$$



Resposta: D

05. Temos:

$$y = \sin \frac{13\pi}{12} \cdot \cos \frac{11\pi}{12}$$

$$\text{Veja: } \frac{13\pi}{12} + \frac{11\pi}{12} = 2\pi \rightarrow \cos \frac{11\pi}{12} = \cos \frac{13\pi}{12}$$

Desse modo, encontramos:

$$y = \sin \frac{13\pi}{12} \cdot \cos \frac{13\pi}{12} \Rightarrow 2y = \sin \frac{26\pi}{12} = \sin \frac{2\pi}{12} \Rightarrow 2y = \sin \frac{\pi}{6} = \frac{1}{2} \Rightarrow y = \frac{1}{4}$$

Resposta: E

