



1. Simplifica o mais possível as seguintes expressões.

a) $\sin(\pi - \alpha) - \sin(2\pi - \alpha) + \cos(-\alpha) + \cos(\pi - \alpha)$

b) $\tan(\pi - \alpha) - \tan(2\pi - \alpha) - 3 \sin(-\alpha) - 2 \sin(2\pi + \alpha)$

c) $\sin(-\alpha) \sin(\pi + \alpha) - \cos(-\alpha) \cos(\pi - \alpha)$

d) $5 \sin\left(\frac{\pi}{2} - \alpha\right) + \cos\left(\frac{\pi}{2} + \alpha\right) - \sin(\pi + \alpha) + 3 \cos(\pi + \alpha)$

e) $\sin\left(\frac{3\pi}{2} - \alpha\right) + \cos(2\pi - \alpha) - \tan(-\alpha) \cos(2\pi - \alpha) + \cos\left(\frac{3\pi}{2} + \alpha\right)$

f) $\sin(\alpha - \pi) - \tan(\alpha + \pi) - \tan(2\pi - \alpha) - 5 \cos\left(\alpha - \frac{3\pi}{2}\right)$

g) $\sin(\alpha - 5\pi) \tan(-\alpha - 4\pi) - 3 \sin\left(\alpha - \frac{\pi}{2}\right) + 2 \cos(7\pi - \alpha)$

h) $\cos\left(\frac{5\pi}{2} + \alpha\right) - \sin\left(\alpha - \frac{7\pi}{2}\right) - \cos(7\pi - \alpha) + 2 \sin(\alpha + 4\pi)$

2. Qual é o valor lógico da proposição:

Se $\sin(\pi - x) > 0$ e $\tan\left(-\frac{\pi}{2} - x\right) < 0$, então $\cos(-\pi - x) < 0$

3. Prova que, para qualquer x para o qual as expressões têm significado, se tem:

a) $1 - \frac{\cos(2\pi+x)}{\tan(2\pi+x) \sin x + \cos(2\pi-x)} = \sin^2 x$

b) $2 \sin\left(\frac{\pi}{2} - x\right) \sin\left(\frac{\pi}{2} + x\right) - \cos(2\pi) = [1 - \sqrt{2} \sin(2\pi + x)][1 - \sqrt{2} \sin(\pi + x)]$

4. Determina o valor das seguintes expressões.

a) $\sin\left(-\frac{\pi}{6}\right) + \sqrt{6} \sin\left(-\frac{\pi}{4}\right) \sin\left(-\frac{\pi}{3}\right)$

b) $\sin\left(-\frac{3\pi}{4}\right) - \cos\left(-\frac{\pi}{4}\right) + \sqrt{5 - \sqrt{3}} \tan\left(-\frac{\pi}{3}\right)$

c) $\frac{\sin\frac{5\pi}{6} + \cos\left(-\frac{3\pi}{4}\right)}{2 + \cos(-\pi) + \cos\left(-\frac{2\pi}{3}\right) - \sin\left(-\frac{3\pi}{4}\right)}$

d) $\frac{\sin\left(-\frac{17\pi}{3}\right)}{\cos\frac{17\pi}{4}} + \sqrt{6} \sin\frac{37\pi}{6}$

5. Seja $x \in \left[\frac{3\pi}{2}, 2\pi\right]$, tal que $\cos\left(\frac{\pi}{2} - x\right) \tan(\pi + x) - \sin\left(\frac{3\pi}{2} - x\right) = 2$.

a) Determina o valor de x .

b) Determina o valor de $\tan(\pi - x) + 2 \cos(\pi + x) - 2 \sin(2\pi - x)$.