(1) Simplifique as seguintes expressões:

(a) $\cos(2x)$

(b) $\operatorname{sen}\left(\frac{\pi}{2} + x\right)$

(c) $\operatorname{sen}\left(\frac{3\pi}{2} - x\right)$

(d) $\dfrac{\operatorname{sen}(2\pi - x) \cdot \cos(\pi - x)}{\operatorname{tg}\left(\frac{\pi}{2} + x\right) \cdot \operatorname{cotg}\left(\frac{3\pi}{2} - x\right)}$

(2) Prove que $(1 + \operatorname{cotg}^2 x)(1 - \cos^2 x) = 1$, para todo x real, $x \neq \pi$.

(3) Demonstre as identidades seguintes:

(a) $\dfrac{\operatorname{sen} x}{\operatorname{cossec} x} + \dfrac{\cos x}{\sec x} = 1$

(b) $\operatorname{tg} x + \operatorname{cotg} x = \sec x \cdot \operatorname{cossec} x$

(c) $\dfrac{\operatorname{cotg}^2 x}{1 + \operatorname{cotg}^2 x} = \cos^2 x$

Gabarito

(1) (a) $\cos(2x) = \cos^2 x - \operatorname{sen}^2 x$

(b) $\operatorname{sen}\left(\frac{\pi}{2} + x\right) = \cos x$

(c) $\operatorname{sen}\left(\frac{3\pi}{2} - x\right) = -\cos x$

(d) $\dfrac{\operatorname{sen}(2\pi - x) \cdot \cos(\pi - x)}{\operatorname{tg}\left(\frac{\pi}{2} + x\right) \cdot \operatorname{cotg}\left(\frac{3\pi}{2} - x\right)} = -\operatorname{sen} x \cdot \cos x$