

Lista 04 - Matemática Básica II - 2016.2

Vimos:

- $\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \operatorname{sen} \alpha \cdot \operatorname{sen} \beta$
- $\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \operatorname{sen} \alpha \cdot \operatorname{sen} \beta$
- $\operatorname{sen}(\alpha + \beta) = \operatorname{sen} \alpha \cdot \cos \beta + \operatorname{sen} \beta \cdot \cos \alpha$
- $\operatorname{sen}(\alpha - \beta) = \operatorname{sen} \alpha \cdot \cos \beta - \operatorname{sen} \beta \cdot \cos \alpha$
- $\operatorname{tg}(\alpha + \beta) = \frac{\operatorname{tg} \alpha + \operatorname{tg} \beta}{1 - \operatorname{tg} \alpha \cdot \operatorname{tg} \beta}$
- $\operatorname{tg}(\alpha - \beta) = \frac{\operatorname{tg} \alpha - \operatorname{tg} \beta}{1 + \operatorname{tg} \alpha \cdot \operatorname{tg} \beta}$
- $\operatorname{tg}(\alpha + \beta) = \frac{\operatorname{tg} \alpha + \operatorname{tg} \beta}{1 - \operatorname{tg} \alpha \cdot \operatorname{tg} \beta}$
- $\operatorname{cotg}(\alpha - \beta) = \frac{\operatorname{cotg} \alpha \cdot \operatorname{cotg} \beta + 1}{\operatorname{cotg} \alpha - \operatorname{cotg} \beta}$
- $\operatorname{cotg}(\alpha + \beta) = \frac{\operatorname{cotg} \alpha \cdot \operatorname{cotg} \beta - 1}{\operatorname{cotg} \alpha + \operatorname{cotg} \beta}$

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1. Secante e Cossecante

a. $\sec(x + y) = \frac{\cos(x - y)}{\cos^2 x - \operatorname{sen}^2 y}$

b. $\sec(x - y) = \frac{\cos(x + y)}{\cos^2 x - \operatorname{sen}^2 y}$

c. $\operatorname{cossec}(x + y) = ?$

d. $\operatorname{cossec}(x - y) = ?$

2. Identidades - Arco Duplo

a. $\operatorname{sen}(2x) = 2 \operatorname{sen} x \cdot \cos x$

b. $\cos(2x) = \cos^2 x - \operatorname{sen}^2 x$

c. $\cos(2x) = 2 \cos^2 x - 1$

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

e. $\operatorname{tg}(2x) = \frac{2 \operatorname{tg} x}{1 - \operatorname{tg}^2 x}$

3. Identidades - Arco Metade

a. $\operatorname{sen}\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 - \cos x}{2}}$

b. $\cos\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 + \cos x}{2}}$

c. $\operatorname{tg}\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 - \cos x}{1 + \cos x}}$

4. Identidades Produto-Soma

a. $\operatorname{sen} \alpha \cos \beta = \frac{\operatorname{sen}(\alpha + \beta) + \operatorname{sen}(\alpha - \beta)}{2}$

b. $\operatorname{sen} \alpha \operatorname{sen} \beta = \frac{\cos(\alpha - \beta) - \cos(\alpha + \beta)}{2}$

c. $\cos \alpha \cdot \cos \beta = ?$

d. $\cos \alpha \cdot \operatorname{sen} \beta = ?$

5. Identidades Soma-Produto

a. $\operatorname{sen} \alpha + \operatorname{sen} \beta = 2 \operatorname{sen}\left(\frac{\alpha + \beta}{2}\right) \cos\left(\frac{\alpha - \beta}{2}\right)$

b. $\operatorname{sen} \alpha - \operatorname{sen} \beta = 2 \cos\left(\frac{\alpha + \beta}{2}\right) \operatorname{sen}\left(\frac{\alpha - \beta}{2}\right)$

c. $\cos \alpha + \cos \beta = 2 \cos\left(\frac{\alpha + \beta}{2}\right) \cos\left(\frac{\alpha - \beta}{2}\right)$

d. $\cos \alpha - \cos \beta = -2 \operatorname{sen}\left(\frac{\alpha + \beta}{2}\right) \operatorname{sen}\left(\frac{\alpha - \beta}{2}\right)$

6. Mostre que:

a. $\frac{\operatorname{sen}(\alpha - \beta)}{\operatorname{sen}(\alpha + \beta)} = \frac{\operatorname{cotg} \beta - \operatorname{cotg} \alpha}{\operatorname{cotg} \beta + \operatorname{cotg} \alpha}$

b. $\frac{\operatorname{sen}(\alpha + \beta) + \operatorname{sen}(\alpha - \beta)}{\cos(\alpha + \beta) + \cos(\alpha - \beta)} = \operatorname{tg} \alpha$