

Exercícios

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Sumário

1 Exercícios

Vimos:

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

Sumário

1 Exercícios

Secante e Cossecante

Mostre que:

$$1. \sec(x + y) = \frac{\cos(x - y)}{\cos^2 x - \sin^2 y}$$

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

$$3. \operatorname{cosec}(x + y) = ?$$

$$4. \operatorname{cosec}(x - y) = ?$$

Identities - Arco Duplo

Mostre que:

$$1. \operatorname{sen}(2x) = 2\operatorname{sen}x \cdot \cos x$$

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

$$3. \cos(2x) = 2\cos^2 x - 1$$

$$4. \cos(2x) = 1 - 2\operatorname{sen}^2 x$$

$$5. \operatorname{tg}(2x) = \frac{2\operatorname{tg}x}{1 - \operatorname{tg}^2 x}$$

Identidades - Arco Metade

Mostre que:

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

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

$$3. \operatorname{tg} \left(\frac{x}{2} \right) = \pm \sqrt{\frac{1 - \cos x}{1 + \cos x}}$$

Identidades Produto-Soma

Mostre que:

$$1. \operatorname{sen} \alpha \cos \beta = \frac{\operatorname{sen}(\alpha + \beta) + \operatorname{sen}(\alpha - \beta)}{2}$$

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

$$3. \cos \alpha \cdot \cos \beta = ?$$

$$4. \cos \alpha \cdot \operatorname{sen} \beta = ?$$

Identidades Soma-Produto

Mostre que:

$$1. \operatorname{sen} \alpha + \operatorname{sen} \beta = 2 \operatorname{sen} \left(\frac{\alpha + \beta}{2} \right) \cos \left(\frac{\alpha - \beta}{2} \right)$$

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

$$3. \cos \alpha + \cos \beta = 2 \cos \left(\frac{\alpha + \beta}{2} \right) \cos \left(\frac{\alpha - \beta}{2} \right)$$

$$4. \cos \alpha - \cos \beta = -2 \operatorname{sen} \left(\frac{\alpha + \beta}{2} \right) \operatorname{sen} \left(\frac{\alpha - \beta}{2} \right)$$

Mostre que:

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

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