

PROBLEMAS DE TRIGONOMETRÍA

Problema 187:

¿A qué línea trigonométrica del arco “a” equivale la expresión siguiente?

$$2 \cdot \operatorname{sen} \frac{a}{2} \left(\cos \frac{a}{2} \cdot \operatorname{tga} - \operatorname{sen} \frac{a}{2} \right) + 1$$

Solución Problema 187:

$$\begin{aligned} (\operatorname{cotg} a - \operatorname{tga}) \cdot [\operatorname{tg}(45^\circ + a) - \operatorname{tg}(45^\circ - a)] &= \frac{\cos a}{\operatorname{sen} a} - \frac{\operatorname{sen} a}{\cos a} \cdot \left[\frac{\operatorname{tg} 45^\circ + \operatorname{tg} a}{1 - \operatorname{tg} 45^\circ \cdot \operatorname{tg} a} - \frac{\operatorname{tg} 45^\circ - \operatorname{tg} a}{1 + \operatorname{tg} 45^\circ \cdot \operatorname{tg} a} \right] = \\ &= \frac{\cos^2 a - \operatorname{sen}^2 a}{\operatorname{sen} a \cdot \cos a} \cdot \left[\frac{1 + \operatorname{tg} a}{1 - \operatorname{tg} a} - \frac{1 - \operatorname{tg} a}{1 + \operatorname{tg} a} \right] = \frac{\cos^2 a - \operatorname{sen}^2 a}{\operatorname{sen} a \cdot \cos a} \cdot \left[\frac{(1 + \operatorname{tg} a)^2 - (1 - \operatorname{tg} a)^2}{1 - \operatorname{tg}^2 a} \right] = \\ &= \frac{\cos^2 a - \operatorname{sen}^2 a}{\operatorname{sen} a \cdot \cos a} \cdot \left[\frac{1 + \operatorname{tg}^2 a + 2\operatorname{tg} a - (1 + \operatorname{tg}^2 a - 2\operatorname{tg} a)}{1 - \operatorname{tg}^2 a} \right] = \\ &= \frac{\cos^2 a - \operatorname{sen}^2 a}{\operatorname{sen} a \cdot \cos a} \cdot \left[\frac{1 + \operatorname{tg}^2 a + 2\operatorname{tg} a - 1 - \operatorname{tg}^2 a + 2\operatorname{tg} a}{1 - \operatorname{tg}^2 a} \right] = \frac{\cos^2 a - \operatorname{sen}^2 a}{\operatorname{sen} a \cdot \cos a} \cdot \left[\frac{4\operatorname{tg} a}{1 - \operatorname{tg}^2 a} \right] = \\ &= \frac{2 \cdot (\cos^2 a - \operatorname{sen}^2 a)}{2 \cdot \operatorname{sen} a \cdot \cos a} \cdot \frac{2 \cdot 2 \cdot \operatorname{tg} a}{1 - \operatorname{tg}^2 a} = \frac{2 \cos 2a}{\operatorname{sen} 2a} \cdot 2 \cdot \operatorname{tg} 2a = \frac{2 \cdot \cos 2a}{\operatorname{sen} 2a} \cdot 2 \cdot \frac{\operatorname{sen} 2a}{\cos 2a} = 2 \cdot 2 = 4 \end{aligned}$$