

PROBLEMAS DE TRIGONOMETRÍA

Problema 10:

Simplifica:

$$\frac{\operatorname{sen}2a}{1 + \operatorname{cos}2a} : \frac{1 + \operatorname{cosa}}{\operatorname{cosa}}$$

Solución Problema 10:

Sabemos que

$$\operatorname{sen}2a = 2\operatorname{sen}a\operatorname{cosa}$$

$$\operatorname{cos}2a = \operatorname{cos}^2a - \operatorname{sen}^2a$$

Luego la 1ª fracción la podemos expresar como:

$$\frac{2\operatorname{sen}a\operatorname{cosa}}{1 + \operatorname{cos}^2a - \operatorname{sen}^2a} : \frac{1 + \operatorname{cosa}}{\operatorname{cosa}}$$

Operamos sobre la fracción a simplificar

$$\frac{2\operatorname{sen}a\operatorname{cosa}}{1 - \operatorname{sen}^2a + \operatorname{cos}^2a} : \frac{1 + \operatorname{cosa}}{\operatorname{cosa}}$$

$$\frac{2\operatorname{sen}a\operatorname{cosa}}{\operatorname{cos}^2a + \operatorname{cos}^2a} : \frac{1 + \operatorname{cosa}}{\operatorname{cosa}}$$

$$\frac{2\operatorname{sen}a\operatorname{cosa}}{2\operatorname{cos}^2a} : \frac{1 + \operatorname{cosa}}{\operatorname{cosa}}$$

$$\frac{\cancel{2}\operatorname{sen}a\cancel{\operatorname{cos}^2a}}{\cancel{2}\operatorname{cos}^2a(1 + \operatorname{cosa})} = \frac{\operatorname{sena}}{1 + \operatorname{cosa}} = \frac{\sqrt{1 - \operatorname{cos}^2a}}{1 + \operatorname{cosa}} = \frac{\sqrt{(1 + \operatorname{cosa})(1 - \operatorname{cosa})}}{1 + \operatorname{cosa}}$$

$$\frac{\sqrt{(1 + \operatorname{cosa})}\sqrt{(1 - \operatorname{cosa})}}{1 + \operatorname{cosa}} = \frac{\sqrt{\cancel{(1 + \operatorname{cosa})}}\sqrt{(1 - \operatorname{cosa})}}{\sqrt{\cancel{(1 + \operatorname{cosa})}}\sqrt{(1 + \operatorname{cosa})}} =$$

$$\frac{\sqrt{(1 - \operatorname{cosa})}}{\sqrt{(1 + \operatorname{cosa})}} = \sqrt{\frac{(1 - \operatorname{cosa})}{(1 + \operatorname{cosa})}} = \operatorname{tg} \frac{a}{2}$$