

Ejercicios resueltos

$$\begin{aligned}
 34.- \quad 1 - \frac{\sin^2 \alpha}{1 + \cos \alpha} &= \cos \alpha \\
 1 - \frac{\sin^2 \alpha}{1 + \cos \alpha} &= \frac{1 + \cos \alpha - \sin^2 \alpha}{1 + \cos \alpha} = \frac{1 - \sin^2 \alpha + \cos \alpha}{1 + \cos \alpha} = \\
 &= \frac{\cos^2 \alpha + \cos \alpha}{1 + \cos \alpha} = \frac{\cos \alpha (\cos \alpha + 1)}{1 + \cos \alpha} = \cos \alpha
 \end{aligned}$$

$$\begin{aligned}
 35.- \quad \frac{1 - \sin \alpha}{1 + \sin \alpha} &= (\sec \alpha - \operatorname{tg} \alpha)^2 \\
 \frac{1 - \sin \alpha}{1 + \sin \alpha} &= (\text{multiplicamos y dividimos por } (1 - \sin \alpha)) = \frac{(1 - \sin \alpha) \cdot (1 - \sin \alpha)}{(1 + \sin \alpha) \cdot (1 - \sin \alpha)} = \\
 \frac{(1 - \sin \alpha)^2}{1 - \sin^2 \alpha} &= \frac{1 - 2\sin \alpha + \sin^2 \alpha}{\cos^2 \alpha} = \frac{1}{\cos^2 \alpha} - \frac{2\sin \alpha}{\cos^2 \alpha} + \frac{\sin^2 \alpha}{\cos^2 \alpha} = \\
 &= \sec^2 \alpha - 2 \frac{1}{\cos \alpha} \frac{\sin \alpha}{\cos \alpha} + \operatorname{tg}^2 \alpha = \sec^2 \alpha - 2 \sec \alpha \operatorname{tg} \alpha + \operatorname{tg}^2 \alpha = (\sec \alpha - \operatorname{tg} \alpha)^2
 \end{aligned}$$

$$\begin{aligned}
 36.- \quad \frac{1 - \cos \alpha}{1 + \cos \alpha} &= (\operatorname{cosec} \alpha - \operatorname{cotg} \alpha)^2 \\
 \frac{1 - \cos \alpha}{1 + \cos \alpha} &= (\text{multiplicamos y dividimos por } (1 - \cos \alpha)) = \frac{(1 - \cos \alpha) \cdot (1 - \cos \alpha)}{(1 + \cos \alpha) \cdot (1 - \cos \alpha)} = \\
 \frac{(1 - \cos \alpha)^2}{1 - \cos^2 \alpha} &= \frac{1 - 2\cos \alpha + \cos^2 \alpha}{\sin^2 \alpha} = \frac{1}{\sin^2 \alpha} - \frac{2\cos \alpha}{\sin^2 \alpha} + \frac{\cos^2 \alpha}{\sin^2 \alpha} = \\
 &= \operatorname{cosec}^2 \alpha - 2 \frac{1}{\sin \alpha} \frac{\cos \alpha}{\sin \alpha} + \operatorname{cotg}^2 \alpha = \operatorname{cosec}^2 \alpha - 2 \operatorname{cosec} \alpha \operatorname{cotg} \alpha + \operatorname{cotg}^2 \alpha = (\operatorname{cosec} \alpha - \operatorname{cotg} \alpha)^2
 \end{aligned}$$

$$\begin{aligned}
 37.- \quad \operatorname{tg} \alpha + \frac{\cos \alpha}{1 + \sin \alpha} &= \sec \alpha \\
 \frac{\sin \alpha}{\cos \alpha} + \frac{\cos \alpha}{1 + \sin \alpha} &= \frac{\sin \alpha (1 + \sin \alpha) + \cos^2 \alpha}{\cos \alpha (1 + \sin \alpha)} = \frac{\sin \alpha + \sin^2 \alpha + \cos^2 \alpha}{\cos \alpha (1 + \sin \alpha)} = \\
 &= \frac{\sin \alpha + 1}{\cos \alpha (1 + \sin \alpha)} = \frac{1}{\cos \alpha} = \sec \alpha
 \end{aligned}$$

$$\begin{aligned}
 38.- \quad \frac{\sin \alpha \cos \alpha}{\cos^2 \alpha - \sin^2 \alpha} &= \frac{\operatorname{tg} \alpha}{1 - \operatorname{tg}^2 \alpha} \\
 \frac{\operatorname{tg} \alpha}{1 - \operatorname{tg}^2 \alpha} &= \frac{\frac{\sin \alpha}{\cos \alpha}}{1 - \frac{\sin^2 \alpha}{\cos^2 \alpha}} = \frac{\sin \alpha \cos \alpha}{\cos^2 \alpha - \sin^2 \alpha}
 \end{aligned}$$