Ejercicios resueltos

13.- $sen^2\,\alpha\,(1 + cotg^2\,\alpha) = 1$

(*recuerda*: $1 + \cotg^2\alpha = \cosec^2\alpha$)

$sen^2\alpha \cdot \cosec^2\alpha = sen^2\alpha \cdot \dfrac{1}{sen^2\alpha} = 1$

14.- $(1 - sen^2\,\alpha)\,(1 + tg^2\,\alpha) = 1$

(*recuerda*: $1 + \tg^2\alpha = \sec^2\alpha$)

$(1 - sen^2\alpha)\,(1 + \tg^2\alpha) = \cos^2\alpha \cdot \sec^2\alpha = \cos^2\alpha \cdot \dfrac{1}{\cos^2\alpha} = 1$

15.- $(sen\,\alpha + cos\,\alpha)^2 + (sen\,\alpha - cos\,\alpha)^2 = 2$

$sen^2\alpha + 2\,sen\alpha\,cos\alpha + cos^2\alpha + sen^2\alpha - 2\,sen\alpha\,cos\alpha + cos^2\alpha =$

$= 2\,sen^2\alpha + 2\,cos^2\alpha = 2\,(\,sen^2\alpha + cos^2\alpha\,) = 2$

16.- $tg^2\,\alpha\,cos^2\,\alpha + cot^2\,\alpha\,sen^2\,\alpha = 1$

$\dfrac{sen^2\alpha}{\cos^2\alpha}\cos^2\alpha + \dfrac{\cos^2\alpha}{sen^2\alpha}\,sen^2\alpha = sen^2\alpha + \cos^2\alpha = 1$

17.- $sec^4\,\alpha - sec^2\,\alpha = tg^4\,\alpha + tg^2\,\alpha$

$(1 + tg^2\,\alpha)^2 - (1 + tg^2\,\alpha) = 1 + 2\,tg^2\,\alpha + tg^4\,\alpha - 1 - tg^2\,\alpha =$

$= tg^4\,\alpha + tg^2\,\alpha$

18.- $cosec^4\,\alpha - cosec^2\,\alpha = cotg^4\,\alpha + cotg^2\,\alpha$

$(1 + cotg^2\,\alpha)^2 - (1 + cotg^2\,\alpha) = 1 + 2\,cotg^2\,\alpha + cotg^4\,\alpha - 1 - cotg^2\,\alpha =$

$= cotg^4\,\alpha + cotg^2\,\alpha$

19.- $sec\,\alpha - tg\,\alpha = \dfrac{cos\,\alpha}{1 + sen\,\alpha}$

$\dfrac{1}{cos\,\alpha} - \dfrac{sen\,\alpha}{cos\,\alpha} = \dfrac{1 - sen\,\alpha}{cos\,\alpha} = \dfrac{1 - sen\,\alpha}{cos\,\alpha} \cdot \dfrac{1 + sen\,\alpha}{1 + sen\,\alpha} = \dfrac{(1 - sen\,\alpha)\cdot(1 + sen\,\alpha)}{cos\,\alpha\cdot(1 + sen\,\alpha)} =$

$= \dfrac{1 - sen^2\,\alpha}{cos\,\alpha\cdot(1 + sen\,\alpha)} = \dfrac{cos^2\,\alpha}{cos\,\alpha\cdot(1 + sen\,\alpha)} = \dfrac{cos\,\alpha}{1 + sen\,\alpha}$

20.- $cosec\,\alpha - cotg\,\alpha = \dfrac{sen\,\alpha}{1 + cos\,\alpha}$

$\dfrac{1}{sen\,\alpha} - \dfrac{cos\,\alpha}{sen\,\alpha} = \dfrac{1 - cos\,\alpha}{sen\,\alpha} \cdot \dfrac{1 + cos\,\alpha}{1 + cos\,\alpha} = \dfrac{sen^2\,\alpha}{sen\,\alpha\cdot(1 + cos\,\alpha)} = \dfrac{sen\,\alpha}{1 + cos\,\alpha}$