Answer on question #34318 – Math – Trigonometry

Please prove this:

(1+sec2A *cot2Y)/(1+sec2B *cot2 Y)=(1+tan2A*cos2Y)/(1+tan2B*cos2Y)

In above 2 is power in all case

Proving

$$\frac{1+\sec^2 A \cot^2 Y}{1+\sec^2 B \cot^2 Y} = \frac{1+\frac{1}{\cos^2 A}\frac{\cos^2 Y}{\sin^2 Y}}{1+\frac{1}{\cos^2 B}\frac{\cos^2 Y}{\sin^2 Y}} = \frac{\cos^2 B \sin^2 Y\,(\cos^2 A \sin^2 Y + \cos^2 Y)}{\cos^2 A \sin^2 Y\,(\cos^2 B \sin^2 Y + \cos^2 Y)} =$$

$$= \frac{\cos^2 B\,(\cos^2 A \sin^2 Y + 1 - \sin^2 Y)}{\cos^2 A\,(\cos^2 B\,(1-\cos^2 Y) + \cos^2 Y)} = \frac{\cos^2 B\,(1 - \sin^2 Y\,(1-\cos^2 A))}{\cos^2 A\,(\cos^2 B - \cos^2 B \cos^2 Y + \cos^2 Y)} =$$

$$= \frac{\cos^2 B\,(\sin^2 A + \cos^2 A - \sin^2 Y \sin^2 A)}{\cos^2 A\left(\cos^2 B + \cos^2 Y\,(1-\cos^2 B)\right)} = \frac{\cos^2 B\,(\cos^2 A + \cos^2 Y \sin^2 A)}{\cos^2 A\,(\cos^2 B + \cos^2 Y \sin^2 B)} =$$

$$= \frac{\frac{(\cos^2 A + \cos^2 Y \sin^2 A)}{\cos^2 A}}{\frac{(\cos^2 B + \cos^2 Y \sin^2 B)}{\cos^2 B}} = \frac{(1+\tan^2 A \cos^2 Y)}{(1+\tan^2 B \cos^2 Y)}.$$

QED.