Answer on Question #36950 – Math –Trigonometry

cot 65degrees-cos25degrees/sin25degrees what's the exact value?

Solution

$$\cot(65^\circ) - \frac{\cos(25^\circ)}{\sin(25^\circ)} = \frac{\cos(65^\circ)}{\sin(65^\circ)} - \frac{\cos(25^\circ)}{\sin(25^\circ)} = \frac{\cos(65^\circ) * \sin(25^\circ) - \cos(25^\circ) * \sin(65^\circ)}{\sin(65^\circ) * \sin(25^\circ)} =$$

Apply formulae

$$\cos(\alpha) * \sin(\beta) = \frac{1}{2}(\sin(\beta - \alpha) + \sin(\beta + \alpha))$$
$$\sin(\alpha) * \sin(\beta) = \frac{1}{2}(\cos(\alpha - \beta) - \cos(\beta + \alpha))$$

and calculate

$\cos(65^\circ) * \sin(25^\circ) = \frac{1}{2}(\sin(25^\circ - 65^\circ) + \sin 90^\circ)) = \frac{1}{2}(1 - \sin 40^\circ)$

$\cos(25^\circ) * \sin(65^\circ) = \frac{1}{2}(\sin(40^\circ) + \sin 90^\circ) = \frac{1}{2}(\sin 40^\circ + 1)$

$$\sin(65^\circ) * \sin(25^\circ) = \frac{1}{2}(\cos(65^\circ - 25^\circ) - \cos(25^\circ + 65^\circ)) = \frac{1}{2}(\cos(40^\circ) - 0) = \frac{1}{2} * \cos(40^\circ)$$

So,

$$\cot(65^\circ) - \frac{\cos(25^\circ)}{\sin(25^\circ)} = \frac{\cos(65^\circ)}{\sin(65^\circ)} - \frac{\cos(25^\circ)}{\sin(25^\circ)} = \frac{\frac{1}{2}(1 - \sin 40^\circ) - \frac{1}{2}(\sin 40^\circ + 1)}{\frac{1}{2} * \cos(40^\circ)} = -\mathrm{tg}(40^\circ) \approx$$

$$\approx -0.839$$