Answer on question #34725 – Math – Trigonometry

sec A + tan A = x, then sec A = ?

Solution

We know that $\sec A = \frac{1}{\cos A}$ and $\tan A = \frac{\sin A}{\cos A}$, so we get

$$\frac{1}{\cos A} + \frac{\sin A}{\cos A} = x$$

$$\frac{1 + \sin A}{\cos A} = x$$

$$1 + \sin A = x \cos A$$

From the Pythagorean identity we get

$$\sqrt{1 - \cos^2 A} = x \cos A - 1$$

Raising to the square

$$1 - \cos^2 A = x^2 \cos^2 A - 2x \cos A + 1$$

$$(1 + x^2) \cos^2 A - 2x \cos A = 0$$

$$\cos A \left((1 + x^2) \cos A - 2x\right) = 0$$

Ascos $A \neq 0$, then we get

$$\cos A = \frac{2x}{1 + x^2}$$

And

$$\sec A = \frac{1 + x^2}{2x}$$

Answer: $\sec A = \frac{1+x^2}{2x}$.