Conditions

if tanθ+secθ=x, prove that sinθ=(X^2-1)(x^2+1)

Solution

We must prove the following:

$$sin\theta = ((tan\theta + sec\theta)^2 - 1)((tan\theta + sec\theta)^2 + 1)$$

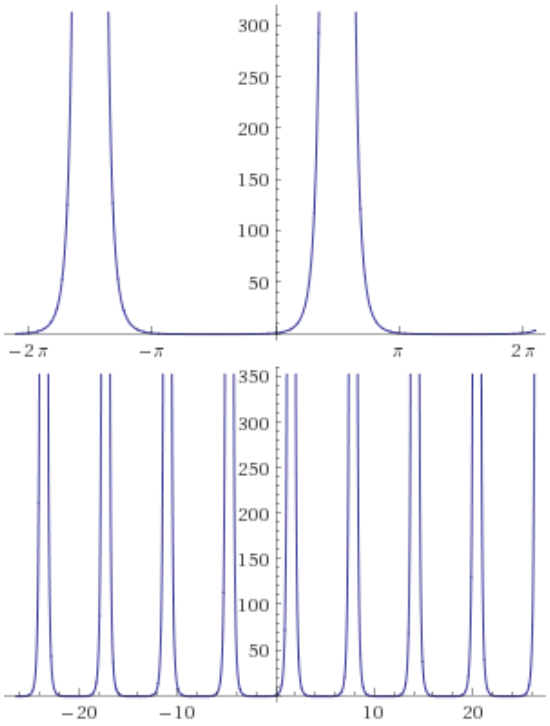
But this is not true for all θ. For example, let's take θ = pi/4. Then:

$$((tan\theta + sec\theta)^2 - 1)((tan\theta + sec\theta)^2 + 1) = \left((1+\sqrt{2})^2 - 1\right)\left((1+\sqrt{2})^2 + 1\right)$$

$$= (1+\sqrt{2})^4 - 1 \approx 32.97$$

And this value must be equal to sinθ. But sinus is a bounded function in interval [-1,1]. So the equation is wrong.

The graph of $(tan\theta + sec\theta)^2 + 1$ is below:



(θ from −6 to 6)

(θ from −20 to 20)

As we see, the graph isn't bounded between -1 and 1 not only in 1 point.