Answer on Question #48646 – Math – Calculus

Question

If y=x+cotx, prove (sin^2)x.(d^2)y/d(x)^2-2y+2x=0

$y = x + \cot x$

Prove:

$$\sin^2 x \frac{d^2y}{dx^2} - 2y + 2x = 0$$

Proof

$$y = x + \cot x$$

$$\frac{dy}{dx} = 1 - \frac{1}{\sin^2 x}$$

$$\frac{d^2y}{dx^2} = 2\frac{\cos x}{\sin^3 x} = 2\frac{\cot x}{\sin^2 x}$$

$$\sin^2 x \frac{d^2y}{dx^2} = \sin^2 x \cdot 2\frac{\cot x}{\sin^2 x} = 2\cot x$$

$$\sin^2 x \frac{d^2y}{dx^2} - 2y + 2x = 2\cot x - 2(x + \cot x) + 2x = 2\cot x - 2x - 2\cot x + 2x = 0$$