If x*sin(y)=sin(p+y), p belongs to R,

show that sin(p)*dy/dx+ sin^2(y)=0.

Solution

Given that x*sin(y)=sin(p+y) $\Rightarrow$ $x = \frac{\sin(p+y)}{\sin(y)}$.

Now differentiating both side of equation,

we get $\frac{dx}{dy} = \frac{\sin(y)*\cos(p+y)-\sin(p+y)*\cos(y)}{sin^2(y)} = \frac{\sin(y-(p+y))}{sin^2(y)} = \frac{\sin(-p)}{sin^2(y)} = -\frac{\sin(p)}{sin^2(y)}$.

If simplify to the linear equation, we get the proofing identity :

$$-\sin(p) * \frac{dy}{dx} = sin^2(y);$$

$$sin^2(y) + \sin(p) * \frac{dy}{dx} = 0.$$

Proved. Problem is done