

Answer on Question #52352 – Math – Calculus

Given that $y(x) = \cot(x)$

Show that $y'(x) = -\operatorname{cosec}^2(x)$ by using the quotient rule

(where $y'(x)$ is the derivative of $y(x)$)

Solution

$$y(x) = \cot(x) = \frac{\cos(x)}{\sin(x)}$$

Using quotient rule:

$$y'(x) = \frac{\cos'(x) * \sin(x) - \sin'(x) * \cos(x)}{\sin^2(x)} = \frac{-\sin^2(x) - \cos^2(x)}{\sin^2(x)} = -\frac{1}{\sin^2(x)} = -\operatorname{cosec}^2(x)$$