

Math 2215 - Calculus 1

Quiz #7 - 2011.02.21

Solutions

If $y = y(x)$, find $\frac{dy}{dx}$ if y satisfies the implicitly defined relation $x^2 + y^2 = \sin(xy)$.

We differentiate both sides:

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

which yields

$$2x + 2y \frac{dy}{dx} = \cos(xy) \left(y + x \frac{dy}{dx} \right)$$

Solving for $\frac{dy}{dx}$ gives

$$\frac{dy}{dx} = \frac{y \cos(xy) - 2x}{2y - x \cos(xy)}$$