Worked Solutions

The Product Rule Q.10

differentiate the function $y = sin(3x)cos(2x)$

The **Product Rule** states that if $y = u(x) \cdot v(x)$

then:

$$\frac{dy}{dx} = \frac{du}{dx} \cdot v(x) + u(x) \cdot \frac{dv}{dx}$$

let $u(x) = sin(3x)$ then $\frac{du}{dx} = 3cos(3x)$

let $v(x) = cos(2x)$ then $\frac{dv}{dx} = - 2sin(2x)$

substituting into the Product Rule equation:

$$\frac{dy}{dx} = 3cos(3x) \cdot cos(2x) + sin(3x) \cdot (- 2sin(2x))$$

simplifying,

$$\frac{dy}{dx} = 3cos(3x)cos(2x) - 2sin(3x)sin(2x)$$