

## Answer on Question #82957 – Math – Differential Equations

### Question

Find the derivative of  $y = \sin 2x + 3\cos 5x$ .

### Solution

Use the Sum Rule, that is:

$$(f(x) + g(x))' = f'(x) + g'(x),$$

and the Chain Rule:

$$\text{if } f(x) = g[h(x)], \text{ then } f'(x) = g'[h(x)] \cdot h'(x).$$

Use derivatives of trigonometric functions  $\sin x$  and  $\cos x$ :

$$(\sin x)' = \cos x, \text{ and } (\cos x)' = -\sin x.$$

Find the derivative of  $y'$ :

$$y' = (\sin 2x)' \cdot (2x)' + (3 \cos 5x)' \cdot (5x)' = \cos 2x \cdot 2 - 3 \sin 5x \cdot 5 = 2 \cos 2x - 15 \sin 5x.$$

**Answer:**  $y' = 2 \cos 2x - 15 \sin 5x$ .