

Math 2215 - Calculus 1

Homework #5 - 2005.10.04

Due Date - 2005.10.11

Solutions

Show that the following functions satisfy the given relationship.

1. $y = e^{2x}$, $\frac{dy}{dx} = 2y$

$$\frac{dy}{dx} = 2e^{2x} = 2y$$

2. $y = xe^x$, $\frac{dy}{dx} = y + e^x$

$$\frac{dy}{dx} = xe^x + e^x = y + e^x$$

3. $y = \cos(ax) + \sin(ax)$, $\frac{d^2y}{dx^2} = -ay$

$$\frac{d^2y}{dx^2} = 2 \frac{\cosh^2(\sqrt{2}x - 2)}{\cosh^3(\sqrt{(2)x})} = 2\operatorname{sech}(\sqrt{2}x) - 4\operatorname{sech}^3(\sqrt{(2)x}) = 2y - 4y^3$$