Assignment 7 Question 3 Examples

Example 1

$\frac{d}{dx}cos(x) = -sin(x)$

$\frac{d}{dx}(1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \cdots) = (0 - \frac{2x}{2!} + \frac{4x^3}{4!} - \frac{6x^5}{6!} + \cdots) = -(x - \frac{x^3}{3!} + \frac{x^5}{5!} - \cdots)$

Example 2

$\frac{d}{dx}cos(x^2) = -2xsin(x^2)$

$\frac{d}{dx}(1 - \frac{(x^2)^2}{2!} + \frac{(x^2)^4}{4!} - \frac{(x^2)^6}{6!} + \cdots) = (0 - 2x\frac{2x^2}{2!} + 2x\frac{4(x^2)^3}{4!} - 2x\frac{6(x^2)^5}{6!} + \cdots) = -2x(x^2 - \frac{(x^2)^3}{3!} + \frac{(x^2)^5}{5!} - \cdots)$

Example 3

$\frac{d}{dx}e^{4x} = 4 * e^{4x}$

$\frac{d}{dx}(1 + 4x + \frac{(4x)^2}{2!} + \frac{(4x)^3}{3!} + \cdots) = (4 + 4\frac{2(4x)}{2!} + 4\frac{3(4x)^2}{3!} + \cdots) = 4(1 + 4x + \frac{(4x)^2}{2!} + \frac{(4x)^3}{3!} + \cdots)$

Example 4

$\frac{d}{dx}e^{x^2} = 2xe^{x^2}$

$\frac{d}{dx}(1+(x^2)+\frac{(x^2)^2}{2!}+\frac{(x^2)^3}{3!}+\cdots) = (0+2x+2x(\frac{2(x^2)}{2!})+2x(\frac{3(x^2)^2}{3!})+\cdots) = 2x(1+(x^2)+\frac{(x^2)^2}{2!}+\frac{(x^2)^3}{3!}+\cdots)$