Calculus

Review

Homework #4
due Thursday 9/27/2012 at 2:30pm

(1) For \(|x|<1\), show \(x + 2^2x^2 + 3^2x^3 + 4^2x^4 + \ldots = \frac{x(1+x)}{(1-x)^3}\)

(2) Evaluate
   \(\text{(i)} \) \(1 + \left(\frac{1}{4}\right) + \left(\frac{1}{4}\right)^2 + \left(\frac{1}{4}\right)^3 + \ldots\)
   \(\text{(ii)} \) \(\frac{1}{4} + 2\left(\frac{1}{4}\right)^2 + 3\left(\frac{1}{4}\right)^3 + \ldots\)
   \(\text{(iii)} \) \(\left(\frac{1}{4}\right) + 2^2\left(\frac{1}{4}\right)^2 + 3^2\left(\frac{1}{4}\right)^3 + \ldots\)

(3) Find the derivatives of the following functions, showing all work.
   \(\text{(a)} \) \(f(x) = \sin(x^2)\)
   \(\text{(b)} \) \(g(x) = \frac{\sin x}{x}\)
   \(\text{(c)} \) \(h(x) = \tan^2(3x-2)\)

(4) Given \(\sin y + \cos x = 1\), find \(y'\)