

**Homework questions for sections 12.6, 12.7, 12.8**

*Math 104, Fall 2007*

1. Find the interval of convergence for the following power series,

$$\sum_{n=0}^{\infty} \frac{(2x + 5)^n}{2n + 1}$$

- A.)  $(-1, 1]$    B.)  $[-1, 1)$    C.)  $(-2, 1]$    D.)  $[-2, 1)$    E.)  $(-3, -2]$    F.)  $[-3, -2)$

2. Find the *first term* (the term with the lowest power of  $x$ ) in the power series for the integral

$$f(x) = \int_0^x \frac{2t}{t^2 + 3} dt.$$

(**Hint:** Start from a geometric series, and modify step-by-step.)

- A.)  $\ln 3$       B.)  $\frac{1}{2}x$       C.)  $\frac{2}{3}x$       D.)  $\frac{1}{2}x^2$       E.)  $\frac{1}{3}x^2$       F.)  $\frac{1}{9}x^3$

3. Find the power series of the function

$$f(x) = \frac{1}{(1+x)^3}.$$

(**Hint:** Start from a geometric series, and modify step-by-step.)

A.)  $f(x) = 1 + 2x + 4x^2 + 8x^3 + \dots$

B.)  $f(x) = 1 - 2x + 4x^2 - 8x^3 + \dots$

C.)  $f(x) = 1 + 3x + 6x^2 + 10x^3 + \dots$

D.)  $f(x) = 1 - 3x + 6x^2 - 10x^3 + \dots$

E.)  $f(x) = 1 + 6x + 12x^2 + 20x^3 + \dots$

F.)  $f(x) = 1 - 6x + 12x^2 - 20x^3 + \dots$