# Math 104-004, Homework 1

Due in recitation on Jan 28 and Jan 30

Please show work, print this sheet, and attach it to the solutions.

**Name:** ______________________________

**Reading** Thomas §10.8 (pages 602-607)

**Problems**

**Fall 2011-7** Find the coefficient of $x_{10}$ in the Maclaurin series (Taylor series at $x = 0$) expansion of $f(x) = e^{-x^2}$
(Hint: think substitution into $e^x$)
(a) $-\frac{1}{120}$ (b) $\frac{1}{10!}$ (c) $\frac{10}{5!}$ (d) $-\frac{10}{5!}$ (e) $\frac{3}{10}$ (f) $\frac{1}{100}$ (g) 1 (h) 0

**Fall 2010-13** Compute the Maclaurin series (i.e., the Taylor series about 0) of $f(x) = x^2 + \arcsin(x) = \sum_{n=0}^{\infty} a_n x^n = a_0 + a_1 x + a_2 x^2 +$ up to and including terms of order two. Then: evaluate $a_0^2 + a_1^2 + a_2^2$.
(Hint: $\frac{d}{dx}\arcsin(x) = \frac{1}{\sqrt{1-x^2}}$)
(A) 0 (B) 1 (C) 2 (D) $\frac{9}{4}$ (E) 3 (F) $\frac{13}{4}$ (G) 4 (H) 5

**Spring 2010-19** The Maclaurin series for the function $x\cos(2x)$ is:

(A) $\frac{2x^2}{2!} - \frac{2x^4}{4!} + \frac{2x^6}{6!} - \frac{2x^8}{8!} + \dots$

(B) $x - \frac{2x^2}{2!} - \frac{2^2x^3}{3!} + \frac{2^3x^4}{4!} + \dots$

(C) $1 + 2x\frac{2^2x^2}{2!} - \frac{2^3x^3}{3!} + \dots$

(D) $1 - \frac{x^2}{2\cdot 2!} - \frac{x^4}{2\cdot 4!} + \frac{x^6}{2\cdot 6!} + \dots$

(E) $x - \frac{2^2x^3}{2!} - \frac{2^4x^5}{4!} + \frac{2^6x^7}{6!} + \dots$

(F) $x - 2x^2 + 2^2x^3 = 2^3x^4 + \dots$