Fall 2016 Math 2B - Midterm II

Name :

Student ID # :

Seat :

I certify that this exam was taken by the person named and done without any form of assistance including books, notes, calculators and other people.

Signature :

1		2	
3		4	
Total			

- *This exam consists of 4 problems.*

- *Read directions for each problem carefully.*

- *Please show all work needed to arrive at your solutions.*

- *Justify all your answers.*

Problem 1 : Evaluate the following integrals.

(a) $\displaystyle\int_0^2 (x^2 - 4)e^{-x}\, dx$ [10 pts.]

(b) $\displaystyle\int \frac{\tan^3(\sqrt{t})\sec(\sqrt{t})}{\sqrt{t}}\,dt$ **[10 pts.]**

(c) $\int \dfrac{\sqrt{x^2 - 9}}{x^4}\, dx$ [10 pts.]

(d) $\displaystyle\int \frac{x^3+1}{x^3+2x}\,dx$ [10 pts.]

Problem 2 : Determine whether each improper integral below is convergent or divergent. Evaluate those that are convergent.

(a) $\displaystyle\int_{1}^{+\infty} \frac{dy}{y^{\sqrt{2}}}$ [5 pts.]

(b) $\displaystyle\int_{0}^{1} x^3 \ln x \, dx$ [10 pts.]

(c) $\displaystyle\int_{-\infty}^{+\infty} e^{2x+1}\,dx$ [10 pts.]

Problem 3 : Find the length of the curve

$$y = \frac{x^2}{4} - \frac{1}{2}\ln x$$

for $\frac{1}{2} \leq x \leq 1$.   **[10 pts.]**

Problem 4 : Determine whether each of the following sequences is convergent or divergent. Justify your answer and specify the limit when you can.

(a) $a_n = e^{\frac{2n^2-1}{3n^2+n}}$ [3 pts.]

(b) $b_n = \left(-\frac{5}{2}\right)^n + 2$ [3 pts.]

(c) $c_n = (3n-5)e^{-n}$ [3 pts.]

(d) $d_n = \frac{(-1)^n}{n}$ [3 pts.]