MATH 152 **EXAM IIA** NAME _____

Mrs. Bonny Tighe 100 points

8.4-12.4 Section _____ Wed. 4/5/2006

There are 11 problems worth 10 points each

1. a) Evaluate the integrals : a) $\int \sqrt{4+x^2}\ dx$

b) $\int \frac{e^x}{e^{2x}+3e^x+2}\ dx$

2. Evaluate the integral. $\int e^{-x} \cos x \, dx$

3. Determine whether each improper integral is divergent or convergent and evaluate those that are convergent using improper integrals.

a) $\int_0^{\infty} \frac{1}{3} e^{-3x} \, dx$

b) $\int_{-1}^{1} \frac{1}{(x+1)^3} dx$

4. Find the arc length of the curve $y = \ln(\sec x)$ *on the* int *erval* $0 \le x \le \pi/4$.

5. Find the sum of the following convergent series.

a) $\sum_{n=1}^{\infty} e^{-n} 5^{n+1}$

b) $\sum_{n=1}^{\infty} \frac{1}{n^2 + 3n + 2}$

6. SET UP BUT DO NOT EVALUATE the area of the surface generated by revolving the given curve about the x-axis and sketch the figure. $y = x^2$, $0 \le y \le 4$

7. State and use the Integral Test to determine whether the series is convergent or divergent.

a) $\sum_{n=1}^{\infty} \frac{2}{n^2+4}$

b) $\sum_{n=1}^{\infty} \frac{1}{n \ln n}$

8. State and use the Limit Comparison Test to determine whether the series $\sum_{n=1}^{\infty} \frac{n+2}{(n+1)^3}$ converges or diverges.

9. State and use The Comparison Test to determine if the following series are convergent or divergent. $\sum_{n=1}^{\infty} \frac{3}{2n^2+3n+5}$

10. Evaluate: $\int_0^{\pi/3} \sin^3 2x \cos^3 2x \, dx$

11. Determine whether the sequence is convergent or divergent, monotonic or bounded. If it converges, find the limit.

a) $a_n = \frac{\sqrt{n}}{2+n}$

b) $a_n = \ln(n+2) - \ln(n+1)$