VERSION IV

Name: _____

TA: _____

Math 222 Prof. Beck

Final Exam Fall 2004

1. For which values of x does the series

$$\sum_{n=2}^{\infty} \frac{\tan(n\pi/3)\ell n(n)}{n} x^n$$

converge?

For which values does it converge absolutely?

Prove your answer.

2. Evaluate:

$$\int e^{2x} \cos 3x dx.$$

3. Evaluate:

$$\int (\csc x)^3 dx.$$

4. To show that the sequence $\{\frac{\sin(n\pi/6)\ell n(n)}{n}\}$ converges to 0, let $\epsilon > 0$ be chosen. Find an $N \in \mathbb{N}$ such that $n > N$ implies that

$$\left|\frac{\sin(n\pi/6)\ell n(n)}{n} - 0\right| < \epsilon.$$

5. Find the equation of the curve for which the sum of the distances from each point P to the points $(-2, 0)$ and $(2, 0)$ is 6.

6. Integrate:

$$\int_0^4 \frac{1}{\sqrt{x}} dx.$$

Prove your answer.

7. Solve:

$$y' + 2y = \sin x.$$

8. Solve by variation of parameters:

$$y'' + y = \csc x \cot x.$$

9. State and prove the Cauchy-Bunyakovsky-Schwarz inequality.

10. Find the cosines of the angles in triangle ABC, where $A = (1, 0, 0)$, $B = (0, 2, 0)$ and $C = (0, 0, 3)$.