Calculus II ESP **Spring 2013**

Final Exam Review

Worksheet # 28

1. Find the volume generated by revolving about the y axis the region bounded by $y = \sqrt{x}$, the x axis, $x = 0$ and $x = 4$.

2. Find the limit as $n \to \infty$. Justify your answer.

   (a) $a_n = \dfrac{\ln n}{\ln(n+1)}$

   (b) $b_n = \dfrac{\cos n + n^2}{3n^2 + 4}$

3. Evaluate the following integrals or state that they diverge.

   (a) $\displaystyle\int_0^\infty xe^{-x^2}\,dx$

   (b) $\displaystyle\int_2^\infty \frac{dx}{x \ln x}$

4. Evaluate $\displaystyle\int \frac{1+e^x}{1-e^x}\,dx$

5. Determine whether each series converges. Justify your answer.

   (a) $\displaystyle\sum \frac{k!}{e^k}$

   (b) $\displaystyle\sum \frac{(-1)^k k!}{e^k}$

6. Find a power series centered at zero for each of the following. Give the interval of convergence for your series.

   (a) $g(x) = \cos x - \sin x$

   (b) $f(x) = \ln(1 + x^2)$

7. (a) Sketch the graph of $r = sin(3\theta)$ in polar coordinates.

   (b) Find the area of the region enclosed by $r = sin(3\theta)$ in polar coordinates.