Test Total 150 pts

Name _____

Final Exam Calculus II Drs. Clemons & Norfolk
May 8, 2006

Show all work. Partial credit will be given for correct reasoning.
(1) Evaluate the following integrals. State if it is an improper integral:

(a) $\displaystyle\int_0^1 \frac{1}{\sqrt{x^2+4x+5}}\,dx$

12 pts

(b) $\displaystyle\int_1^3 \frac{x+3}{x^2-3x}\,dx$

12 pts

(c) $\displaystyle\int 3x2^x\,dx$

12 pts

Pg 1 Tot: 36

(d) $\displaystyle\int \frac{\sec^2 t}{1-\tan t}\,dt$

12 pts

(e) $\displaystyle\int \sin^3 x \cos^8 x\,dx$

12 pts

(f) $\displaystyle\int \sqrt{2-x^2}\,dx$

12 pts

Pg 2 Tot: 36

(2) Sketch the region inside $r = 2 + 2\sin\theta$ and outside $r = 3$, then Set-up the integral representing the area. **Do Not Solve Your Integral.**

10 pts

(3) Convert the polar equation, $r = \dfrac{10}{3 - 2\cos\theta}$, to a cartesian equation and *identify the conic section, including any centers, major/minor axes, intercepts and asymptotes.*

10 pts

Pg 3 Tot: 20

(4) Given the parametric curve $x(t) = t^2$, $y(t) = t - \frac{1}{3}t^3$, for $0 \leq t \leq 1$,

(a) Calculate $\frac{d^2y(t)}{dx^2}$

10 pts

Set-up , but do not evaluate the integrals necessay to calculate

(b) the arclength for $0 \leq t \leq 1$.

8 pts

(c) the area of the surface generated by revolving the parametric curve about the x-axis.

8 pts

(d) the area under the parameterized curve.

8 pts

Pg 4 Tot: 34

(4) Find the interval of convergence of the power series $\sum_{n=2}^{\infty} \frac{\ln n}{n} (x-1)^n$. Determine the convergence or divergence at the endpoints.

12 pts

(5) Write a power series expansion, $\sum_{n=0}^{\infty} A_n x^n$ and state the radius of convergence for

(a) $\ln(1+x)$

4 pts

(b) $\frac{x}{3+2x}$

4 pts

(c) $\ln(1+x) + \frac{x}{3+2x}$

4 pts

Pg 5 Tot: 24