Test Total 150 pts

Name _____

Final Exam Calculus II Dr. Norfolk

Dec 7, 2009

Show all work. Partial credit will be given for correct reasoning.

1. Show that $f(x) = x^3 + e^x$ has an inverse $g(x)$, and find $g'(8 + e^2)$.

10 points

2. Use logarithmic differentiation to find the derivative of $y = \dfrac{e^{2x^3}\sqrt{3x^2 - 5}}{(x+1)^{12}}$

10 points

3. Evaluate the integral $\int t \cos 2t \; dt$.

10 points

Page 1 Total (30)

4. Evaluate the integral $\displaystyle\int \frac{dx}{x\sqrt{9-x^2}}$.

10 points

5. Find the interval of convergence for the power series $\displaystyle\sum_{n=1}^{\infty} \frac{\ln n(1-2x)^n}{n}$.

10 points

6. Use the Maclaurin series for $\cos x$ to write $\displaystyle\int_0^2 \cos(x^3)\,dx$ as a series.

10 points

Page 2 Total (30)

7. Consider the curve $y = \dfrac{x^3}{6} + \dfrac{1}{2x}$, $1 \leq x \leq 2$.

(a) Show that the *arc length differential*, is $ds = \left(\dfrac{x^2}{2} + \dfrac{1}{2x^2}\right)\, dx$.

10 points

(b) This curve is rotated once about the x-axis. Find the resulting *surface area*.

10 points

8. Find the area inside the *cardioid* $r = a(1 + \sin\theta)$.

10 points

Page 3 Total (30)