

MATH 152
Mrs. Bonny Tighe

FINAL EXAM
200 points

NAME _____

Section _____ Fri 5/19/06

1. Find the derivative using logarithmic differentiation.

a) $f(x) = \left(\frac{x+1}{x+2} \right)^x$

2. Evaluate: a) $\int \csc^3 \alpha \, d\alpha = \underline{\hspace{2cm}}$

b) $\int e^{-x} \sin 2x \, dx =$ _____

3. Find the following limits. a) $\lim_{x \rightarrow \infty} \left(\frac{e^{2x}}{x^3} \right) =$ _____

b) $\lim_{x \rightarrow 0^+} (\cos x)^{1/x^2} =$ _____ c) $\lim_{x \rightarrow 0^+} x^2 \ln x =$ _____

4. Evaluate: $\int x^3 \sqrt{9x^2 - 1} \, dx$

5. Evaluate the integral using partial fractions: $\int \frac{x^3 + 3}{x^2 - 2x - 3} dx = \underline{\hspace{2cm}}$

6. Find the Maclaurin series for the given function and find the radius and interval of convergence. $f(x) = \frac{1}{\sqrt{x+4}}$

7. Determine whether the series are convergent or divergent using the given test.

Comparison Test

a) $\sum_{n=0}^{\infty} \frac{\sin n}{n^2 + 1}$

Integral Test

b) $\sum_{n=2}^{\infty} \frac{2}{n \ln n}$

8. Find the radius of convergence and the interval of convergence if it is convergent.

$$\sum_{n=2}^{\infty} \frac{1 \cdot 4 \cdot 7 \cdots (3n-5)(x+1)^{2n-1}}{(\ln n)n!} (-1)^{n-1}$$

9. Expand $\frac{1}{(1-2x)^3}$ as a power series using the binomial series. State the radius of convergence.

10. Set up but do not evaluate the following:

a) Find the length of the curve, $x = \sec t$, $y = \ln(1+t)$, $0 \leq t \leq 2$

b) Find the surface area generated by revolving the given curve about the y-axis.
 $y = \ln(\cos x)$, $0 \leq y \leq 3$

11. Sketch the curve and find the area that it encloses. $r = 3 \cos 2\theta$

12. a) Find the foci, vertices and center of the ellipse $9x^2 + 4y^2 + 18x - 16y = 11$ and then sketch the graph.

b) Find the vertices, foci and asymptotes of the hyperbola and sketch its graph.

$$\frac{x^2}{9} - \frac{y^2}{16} = 1$$