

Math 106 AB
Calculus 2
Mr. Balcomb
Exam 2
November 6, 2009

1. Evaluate: $\int \frac{1-x}{2x^2+x} dx$

2. Evaluate: $\int \frac{2x-3}{x^2+1} dx$

3. Evaluate: $\int \arcsin(x) dx$

4. Does $\int_1^{\infty} \frac{x}{x^5 + 1} dx$ converge? Justify your answer.

5. Determine if the following integrals converge or diverge. If the integral converges, evaluate the integral.

a) $\int_0^{\infty} e^{-0.02x} dx$

b) $\int_0^{\infty} \frac{1}{\sqrt{x}} dx$

6. Find a value for the parameter a that makes the value of the improper integral

$$\int_a^{\infty} \frac{dx}{x(\ln x)^2} \text{ less than } 0.1.$$

7. Find the integral: $\int \frac{\sin^2(x)}{\cos(x)} dx$

8. Give the third order Taylor polynomial ($x_0 = 0$) for $f(x) = \sqrt{x+4}$

9. The third order Maclaurin polynomial ($x_0 = 0$) for $f(x) = e^{-3x}$ is

$$P_3(x) = 1 - 3x + \frac{9}{2}x^2 - \frac{9}{2}x^3$$

a) Calculate $|f^{(4)}(x)|$.

b) If $I = [0, 1]$, find an upper bound K_4 for $|f^{(4)}(x)|$.

- c) Taylor's Theorem says that $|f(x) - P_3(x)| \leq \frac{K_4}{4!} |x - x_0|^4$ for all values of x in an interval I containing x_0 . Calculate the maximum approximate error for values of x in I , i.e. the maximum value of $\frac{K_4}{4!} |x - x_0|^4$ on I .

10. Evaluate: $\int \frac{x^2}{\sqrt{9 - x^2}} dx$