

Calculus II - Fall 2013

Midterm Exam I, October 3, 2013

MC (10 points). *This part consists of 5 multiple choice problems. Nothing more than the answer is required; consequently no partial credit will be awarded.*

1. Find $\int \frac{dx}{2x+7}$.

Ⓐ $\ln|2x+7| + C$

Ⓑ $2 \ln|2x+7| + C$

Ⓒ $\frac{1}{2} \ln|2x+7| + C$

Ⓓ $\frac{1}{7} \ln|2x+7| + C$

Ⓔ $\frac{7}{2} \ln|2x+7| + C$

2. Find $\int \sqrt{3x+5} dx$.

Ⓐ $\frac{2}{9}(3x+5)^{3/2} + C$

Ⓑ $\frac{1}{3}(3x+5)^{3/2} + C$

Ⓒ $\frac{1}{5}(3x+5)^{3/2} + C$

Ⓓ $3(3x+5)^{-1/2} + C$

Ⓔ $3(3x+5)^{3/2} + C$

3. Find $\int \sin(1 - 5x)dx$.

Ⓐ $-\frac{1}{5} \cos(5x - 1) + C$

Ⓑ $\frac{1}{5} \cos(5x - 1) + C$

Ⓒ $5 \cos(5x - 1) + C$

Ⓓ $-5 \cos(5x - 1) + C$

Ⓔ None of the above

4. Find $\int e^{(2+x)/3} dx$.

Ⓐ $e^{(2+x)/3} + C$

Ⓑ $2e^{(2+x)/3} + C$

Ⓒ $\frac{1}{2}e^{(2+x)/3} + C$

Ⓓ $\frac{1}{3}e^{(2+x)/3} + C$

Ⓔ $3e^{(2+x)/3} + C$

5. Find $\int \frac{dx}{1+x^2}$.

Ⓐ $\ln(1+x^2) + C$

Ⓑ $\arcsin x + C$

Ⓒ $\arccos x + C$

Ⓓ $\arctan x + C$

Ⓔ $\tan x + C$

FR (40 points). *This part consists of 10 questions. Each question will be graded on a pass/fail basis. You are required to show all your work and provide the necessary explanations everywhere to get full credit.*

Find the following integrals:

1. $\int \frac{\sqrt[3]{x^2} - \sqrt[4]{x}}{\sqrt{x}} dx$

2. $\int_0^{\pi/6} (1 + \sin x)^5 \cos x dx$

3. $\int x^5 \ln 7x dx$

4. $\int \cos^2 7x dx$

5. $\int \frac{1}{x^2\sqrt{x^2-2}} dx$

6. $\int \frac{4x+1}{x^2-4} dx$

$$7. \int_1^{\infty} \frac{1}{(2x+1)^2} dx$$

$$8. \int_0^2 \frac{1}{\sqrt[3]{1-x}} dx$$

9. Use the Comparison Test to determine whether the integral $\int_2^{\infty} \frac{\cos^2 x}{x^2} dx$ converges or diverges. You do not need to evaluate the integral if it converges.

10. Estimate the integral $\int_1^3 e^{x^2} dx$ using Simpson's Rule with $n = 4$ (*leave your answer in an e-form*). Give an upper bound for the error involved in this approximation.