

MAT 266

SPRING 2012

TEST 1

SoMSS, ASU

Directions:

1. There are 14 questions worth a total of 60 points.
2. Questions 1 - 10 are Multiple Choice/ True/False worth 4 points each to be answered on the supplied SCANTRONS
3. Questions 11 - 14 are Free Responses worth 5 points each and are to be answered in the space provided on the test.
4. Read all the questions carefully.
5. For the Free Response, you must show all work in order to receive credit!!
When possible, box your answer, which must be complete, organized, and exact unless otherwise directed.
6. Always indicate how a calculator was used (i.e. sketch graph, etc. ...).
7. No calculators with QWERTY keyboards or ones like TI-89 or TI-92 that do symbolic algebra may be used.

Honor Statement:

By signing below you confirm that you have neither given nor received any unauthorized assistance on this exam. This includes any use of a graphing calculator beyond those uses specifically authorized by the Mathematics Department and your instructor. Furthermore, you agree not to discuss this exam with anyone until the exam testing period is over. In addition, your calculator's program memory and menus may be checked at any time and cleared by any testing center proctor or Mathematics Department instructor.

Signature

Date

1. Evaluate the integral: $\int \frac{2y}{y^2+3} dy$

Select the correct answer.

- a. $\tan^{-1}(y^2+3)+C$
- b. $2\ln|y^2+3|+C$
- c. $\ln(y^2+3)+C$
- d. $y^2\ln|y^2+3|+C$
- e. none of these

2. Evaluate the integral using integration by parts with the indicated choices of u and dv :

$$\int 4x \ln x \, dx$$

Select the correct answer.

- a. $2x^2 \ln x + x^2 + C$
- b. $2x^2 \ln x - x^2 + C$
- c. $2x^2 \ln x - x + C$
- d. $2x^2 \ln x - 4x^2 + C$
- e. none of these

3. Use the given formula to evaluate the integral: $\int \frac{1}{y^2\sqrt{4y^2-1}} dy$

(Formula: $\int \frac{du}{u^2\sqrt{u^2-a^2}} = \frac{\sqrt{u^2-a^2}}{a^2u} + C$)

Select the correct answer.

- a. $y\sqrt{4y^2-1}+C$
- b. $[\sqrt{4y^2-1}/y]+C$
- c. $\sqrt{4y^2-1}+C$
- d. $[\sqrt{4y^2+1}/y]+C$
- e. none of these

4. Select the correct answer for $\int f'(x) \cos(f(x)) dx$ from the options given below:

- a. $\sin(f(x)) + C$
- b. $-\sin(f(x)) + C$
- c. $\sin|f(x)| + C$
- d. $\frac{\sin x}{f(x)} + C$
- e. None of these.

5. The form of the partial fractions expansion of the rational function $\frac{x^3 + 2x + 5}{(x+1)^2(x^2+3)}$ is:

- a. $\frac{A}{(x+1)^2} + \frac{B}{(x^2+3)}$
- b. $\frac{A}{(x+1)^2} + \frac{B}{x+1} + \frac{C}{(x^2+3)}$
- c. $\frac{A}{(x+1)^2} + \frac{B}{x+1} + \frac{C}{x+3} + \frac{D}{(x+3)^2}$
- d. $\frac{A}{(x+1)^2} + \frac{B}{x+1} + \frac{Cx+D}{(x^2+3)}$
- e. None of these

6. For the integral $\int \frac{dx}{x^2\sqrt{x^2-16}}$ choose the appropriate trig-substitution from the list provided below:

Select the correct answer.

- a) $x = 4 \sin \theta$
- b) $x = 4 \tan \theta$
- c) $x = 4 \sec \theta$
- d) $x = 4 \cos \theta$
- e) None of the above

7. Using the trig-substitution from Problem # 6 above, the resulting trigonometric integral in its simplified form is:

- a) $\frac{1}{4} \int \tan \theta d\theta$
- b) $\frac{1}{4} \int \sin \theta d\theta$
- c) $\frac{1}{16} \int \cos \theta d\theta$
- d) $\frac{1}{16} \int \sec \theta d\theta$
- e) None of these

8. Use the Trapezoidal Rule to approximate $\int_2^3 e^{3/x} dx$ for $n = 4$.

Select the correct answer. The choices are rounded to four decimal places.

- a. 3.4215
- b. 3.4437
- c. 3.4227
- d. 3.5227
- e. None of these.

9. Evaluate the integral: $\int 2 \tan x \sec^2 x dx$

Select the correct answer.

- a. $\tan |x| + C$
- b. $2 \sec x \tan x + C$
- c. $\sec x + C$
- d. $\tan^2 x + C$
- e. none of these

10. Select the appropriate substitution from the list given below that would simplify the evaluation of the

integral $\int_{-1}^{\sqrt{3}} \frac{e^{\arctan y}}{1 + y^2} dy$

- a. $u = 1 + y^2$
- b. $u = \arctan y$
- c. $u = \tan y$
- d. $u = 1/(1 + y^2)$
- e. None of these

FREE RESPONSE

11. [5 pts] Evaluate the integral: $\int te^{-4t} dt$

12. [5 pts] Evaluate the integral: $\int \cos^5 x \sin^2 x dx$

13. [5 pts] Find the exact value of $\int_0^{\pi/4} \cos^2 x \, dx$

14. [5 pts] Evaluate the integral: $\int \frac{x-9}{(x+5)(x-2)} \, dx$