MA 162 EXAM 2 Form A Fall 2010

NAME ______________________________

STUDENT ID ______________________________

RECITATION INSTRUCTOR ______________________________

RECITATION TIME ______________________________

1. Fill in your name, your student ID, your recitation instructors name, and your recitation time above.
2. Be sure that the color of your answer sheet matches the color of your exam.
3. On the answer sheet, write your **name**, your **division and section number**, and your **student identification number**, and fill in the corresponding circles. Leave the test/quiz number blank. Also, fill in the (recitation) **instructor name**, the **course** (MA 162), and **date** (10/19/10).
3. There are 12 questions. The first 8 are worth 8 points each and the last 4 are worth 9 points each. For each question, mark the letter corresponding to your answer on the answer sheet.
4. At the end of the exam turn in both the question sheets and the answer sheet.
5. No books, notes, or calculators may be used.

1. Evaluate $\int_0^{\pi/2} \cos^3 x \sin^2 x \, dx$.

A. $\frac{2}{15}$

B. $\frac{7}{10}$

C. $\frac{15}{24}$

D. $\frac{1}{8}$

E. $\frac{4}{9}$

2. Evaluate $\int_0^{\pi/4} \tan x \sec^4 x \, dx$.

A. $\frac{\pi}{8}$

B. $\frac{2}{3}$

C. $\frac{3}{4}$

D. $\frac{1}{2}$

E. $\frac{\pi}{4}$

3. When one makes a suitable trigonometric substitution to evaluate

$$\int \frac{x^3}{\sqrt{x^2-9}}\,dx,$$

which integral arises?

A. $27\int \sec^4\theta\,d\theta$

B. $\frac{1}{27}\int \sec^4\theta\tan\theta\,d\theta$

C. $9\int \frac{\sec^3\theta}{\tan\theta}\,d\theta$

D. $27\int \sin^3\theta\,d\theta$

E. $9\int \frac{\sin^3\theta}{\cos\theta}\,d\theta$

4. Evaluate $\int_0^{1/\sqrt{2}} \frac{x^2}{\sqrt{1-x^2}}\,dx.$

A. $\frac{\pi}{2}-\frac{1}{8}$

B. $\frac{\pi}{2}-\frac{\sqrt{3}}{2}$

C. $\frac{\pi}{8}-\frac{\sqrt{2}}{2}$

D. $\frac{\pi}{8}-\frac{1}{4}$

E. $\frac{\pi}{3}+\sqrt{2}$

5. Compute $\int_{-2}^{0} \frac{dx}{x^2+4x+8}$.

A. $\frac{\pi}{16}$

B. $\frac{\pi}{8}$

C. $1+\frac{\pi}{2}$

D. $\frac{\pi}{4}$

E. $\frac{\pi}{2}$

6. Find the correct form of the partial fraction decomposition of

$$\frac{x-5}{(x-1)^2(x^2-9)(x^2+9)}.$$

A. $\frac{A}{x-1}+\frac{B}{(x-1)^2}+\frac{C}{x-3}+\frac{D}{x+3}+\frac{Ex+F}{x^2+9}$

B. $\frac{A}{(x-1)^2}+\frac{B}{x-3}+\frac{C}{x+3}+\frac{Dx+E}{x^2+9}$

C. $\frac{A}{x-1}+\frac{B}{(x-1)^2}+\frac{C}{x^2-9}+\frac{Dx+E}{x^2+9}$

D. $\frac{A}{(x-1)^2}+\frac{Bx+C}{x^2-9}+\frac{Dx+E}{x^2+9}$

E. $\frac{A}{(x-1)^2}+\frac{B}{x^2-9}+\frac{C}{x^2+9}$

7. Evaluate $\displaystyle\int_0^2 \frac{1}{(x+1)(x+2)}\,dx.$

A. $\ln 2 - \ln 4$

B. $\ln 2 + \ln 4 + \ln 3$

C. $\dfrac{\ln 3}{2} + \dfrac{\ln 4}{2} + \ln 2$

D. $\ln 3 - \ln 4$

E. $\ln 3 - \ln 4 + \ln 2$

8. Given that $\displaystyle\int_1^2 \frac{1}{x^2-2x+2}\,dx = \frac{\pi}{4},$ evaluate

$$\int_1^2 \frac{3x+5}{x^2-2x+2}\,dx.$$

A. $\ln 2 + \dfrac{\pi}{4}$

B. $2\ln 2 - \dfrac{\pi}{2}$

C. $\dfrac{3}{2}\ln 2 + 2\pi$

D. $\dfrac{1}{2}\ln 2 + \dfrac{\pi}{2}$

E. $\dfrac{3}{4}\ln 2 + \dfrac{\pi}{6}$

9. Which of the following improper integrals converge.

(1) $\displaystyle\int_1^{\infty} \frac{x^2+2x+1}{x^5+1}\,dx,$ (2) $\displaystyle\int_{-1}^{1} \frac{1}{x^3}\,dx,$ (3) $\displaystyle\int_1^{\infty} e^{-x}\cos^2 x\,dx.$

A. (1) and (2) converge. (3) diverges.

B. (1) and (3) converge. (2) diverges.

C. (2) and (3) converge. (1) diverges.

D. (1) converges. (2) and (3) diverge.

E. (1), (2) and (3) converge.

10. Find the arclengh of the curve

$$y = \frac{2}{3}(x+1)^{3/2}, \qquad -1 \le x \le 2.$$

A. $\frac{2}{3}$

B. $\frac{7}{6}$

C. $\frac{8}{3}$

D. $\frac{14}{3}$

E. $\frac{20}{3}$

11. Which integral gives the surface area of the surface obtained by rotating the curve

$$y = 1 + 2x^2, \qquad 0 \le x \le 1,$$

about the y–axis.

A. $2\pi \int_0^1 (1+2x^2)\sqrt{1+16x^2}\,dx$

B. $2\pi \int_0^1 x\sqrt{1+16x^2}\,dx$

C. $2\pi \int_0^1 x(1+2x^2)\,dx$

D. $2\pi \int_0^1 x(1+16x^2)\,dx$

E. $2\pi \int_0^1 (1+2x^2)(1+16x^2)\,dx$

12. The substitution $u = \sqrt{1+x}$ transforms the integral

$$\int_3^8 \frac{1}{x\sqrt{1+x}}\,dx$$

into which integral?

A. $\int_3^8 \frac{1}{(u^2-1)u}\,du$

B. $\int_2^3 \frac{1}{(u^2-1)u}\,du$

C. $\int_2^3 \frac{2u}{u^2-1}\,du$

D. $\int_3^8 \frac{1}{u^2-1}\,du$

E. $\int_2^3 \frac{2}{u^2-1}\,du$