Student (Print) _____ Section _____

Last, First Middle

Student (Sign) _____

Student ID _____

Instructor _____

MATH 152, Fall 2007

Common Exam 1

Test Form B

Instructions:

You may not use notes, books, calculator or computer.

Part I is multiple choice. There is no partial credit.

Mark the Scantron with a #2 pencil. For your own records, also circle your choices in this exam. Scantrons will be collected after 90 minutes and may not be returned.

Part II is work out. Show all your work. Partial credit will be given.

THE AGGIE CODE OF HONOR:
An Aggie does not lie, cheat or steal, or tolerate those who do.

For Dept use Only:	
1-10	/50
11	/10
12	/10
13	/10
14	/10
15	/10
TOTAL	

Part I: Multiple Choice (5 points each)

There is no partial credit.

1. Compute $\int_0^1 xe^{(x^2+1)}\,dx$

a. $\frac{1}{2}(e^2 - e)$

b. $\frac{1}{2}(e^2 - 1)$

c. $\frac{1}{2}e^2$

d. $\frac{1}{2}(e - 1)$

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

2. Compute $\int_0^{\pi/2} x\cos x\,dx$

a. $\pi - 1$

b. $1 - \pi$

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

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

e. $\frac{\pi}{2} - 1$

3. Find the area below the parabola, $y = 3x - x^2$, above the x-axis.

a. $\frac{81}{2}$

b. $\frac{27}{2}$

c. $\frac{9}{2}$

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

e. $\frac{10}{3}$

4. Find the average value of $f(x) = e^{3x}$ on the interval $[0, 2]$.

a. $\frac{1}{6}e^6$

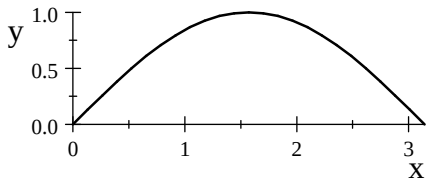
b. $\frac{1}{6}(e^6 - 1)$

c. $\frac{1}{3}e^6$

d. $\frac{1}{3}(e^6 - 1)$

e. $(e^6 - 1)$

5. The region shown at the right is bounded above by $y = \sin x$ and below by the x-axis. It is rotated about the x-axis. Find the volume swept out.



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

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

c. 2π

d. $2\pi^2$

e. $\frac{\pi^2}{2}$

6. The region in Problem 5 is rotated about the the line $x = -1$. Which formula gives the volume swept out?

a. $\int_0^{\pi} \pi(1 + \sin x)^2 \, dx$

b. $\int_{-1}^{\pi} 2\pi x \sin x \, dx$

c. $\int_0^{\pi} \pi(x - 1) \sin x \, dx$

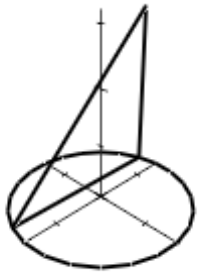
d. $\int_0^{\pi} 2\pi(x + 1) \sin x \, dx$

e. $\int_0^{\pi} \pi\left((1 + \sin x)^2 - 1\right) dx$

7. The region bounded by the curves $x = 1,\ \ y = 1$ and $y = \frac{4}{x}$ is rotated about the x-axis. Find the volume swept out.

a. 8π
b. 9π
c. 12π
d. $\pi(15 - 8\ln 4)$
e. $\pi(8\ln 4 - 15)$

8. A solid has a base which is a circle of radius 2 and has cross sections perpendicular to the y-axis which are isosceles right triangles with a leg on the base. Find the volume of the solid.



a. $\frac{64}{3}$
b. $\frac{128}{3}$
c. $\frac{16}{3}\pi$
d. $\frac{32}{3}\pi$
e. $\frac{32}{3}$

9. A certain spring is at rest when its mass is at $x = 0$.
It requires 24 Joules of work to stretch it from $x = 0$ to $x = 4$ meters.
What is the force required to maintain the mass at 4 meters?

a. 6 Newtons
b. 12 Newtons
c. 18 Newtons
d. 24 Newtons
e. 48 Newtons

10. Find the partial fraction expansion for $f(x) = \frac{5x^2 + x + 12}{x^3 + 4x}$.

a. $\frac{2}{x} + \frac{x - 3}{x^2 + 4}$
b. $\frac{1}{x} + \frac{2x + 3}{x^2 + 4}$
c. $\frac{2}{x} + \frac{3x + 1}{x^2 + 4}$
d. $\frac{3}{x} + \frac{2x + 1}{x^2 + 4}$
e. $\frac{1}{x} + \frac{3x - 2}{x^2 + 4}$

Part II: Work Out (10 points each)

Show all your work. Partial credit will be given.

11. Compute

a. (5 points) $\int \sin^3\theta \, d\theta$

b. (5 points) $\int x^2 \ln x \, dx$

12. Find the area between the cubic $y = x^3 - x^2$ and the line $y = 2x$.

13. A water tower is made by rotating the curve $y = x^4$ about the y-axis, where x and y are in meters. If the tower is filled with water (of density $\rho = 1000$ kg/m^3) up to height $y = 25$ m, how much work is done to pump all the water out a faucet at height 30 m? Assume the acceleration of gravity is $g = 9.8$ m/sec^2. You may give your answer as a multiple of ρg.

14. Compute $\int_0^2 \frac{x^2}{(16-x^2)^{3/2}}\,dx$

15. Compute $\int_0^2 \frac{x-2}{x^2+4}\,dx$.