

Math 113 Fall 2012 Exam 1 Part A

RED DO NOT WRITE
TWO PART

Instructions:

- Bubble your answer to the questions on the provided scantron. Use a # 2 pencil.
- Calculators are not allowed.
- Do not write on the exam. Use your own scratch paper, or part B. Scratch paper will not be saved.
- Please do not talk about the test with other students until after the last day to take the exam.

Part A: Multiple Choice *Mark the correct answer on the bubble sheet provided.*

1. What is the area enclosed by the region between $y = x^2$ and $y = x + 2$ from $x = 0$ to $x = 1$?

- a) $\frac{5}{2}$ b) $\frac{13}{6}$ c) 2
d) $\frac{5}{3}$ e) $\frac{17}{6}$ f) None of these.

2. What is the volume created by rotating the region between the curve $y = \sqrt{x+1}$ and the x -axis from $x = -1$ to $x = 3$ about the line $y = 2$?

- a) $\int_{-1}^3 2\pi x\sqrt{x+1} dx$ b) $\int_{-1}^3 2\pi(2-x)\sqrt{x+1} dx$ c) $\int_{-1}^3 2\pi(x-2)\sqrt{x+1} dx$
d) $\int_{-1}^3 \pi(4-(x+1)) dx$ e) $\int_{-1}^3 \pi(4-[\sqrt{x+1}-2]^2) dx$ f) None of these.

3. A particular solid has a circular base with radius 1 meter. Cross sections perpendicular to the x -axis are squares. Which integral gives the volume of the object?

- a) $\int_{-1}^1 4(1-x^2) dx$ b) $\int_{-1}^1 2\sqrt{1-x^2} dx$ c) $\int_{-1}^1 (1-x^2) dx$
d) $\int_{-1}^1 \sqrt{1-x^2} dx$ e) $\int_{-1}^1 4(1-x) dx$ f) None of these

Continue to Next Page

4. If the region enclosed by the curves $y = \sin x$ and $y = \cos x$ from $x = 0$ to $x = \pi/4$ is rotated about $x = -1$, what is the volume?

a) $\int_0^{\pi/4} 2\pi(x-1)(\cos x - \sin x) dx$ b) $\int_0^{\pi/4} 2\pi(x+1)(\cos x - \sin x) dx$
 c) $\int_0^{\pi/4} 2\pi(x-1)(\cos x + \sin x) dx$ d) $\int_0^{\pi/4} 2\pi(x+1)(\cos x + \sin x) dx$
 e) $\int_0^{\pi/4} 2\pi x(\cos x - \sin x) dx$ f) None of these

5. W_1 is the work done by lifting a stone that weighs 1 lb a vertical distance of 1 ft. W_2 is the work done by lifting a stone that weighs 2 lb a vertical distance of 2 ft.

Which of the following identities is true?

a) $W_2 = W_1$ b) $W_2 = 2W_1$ c) $W_2 = 4W_1$
 d) $W_2 = 8W_1$

6. What is the average of $\sin(x)$ in the interval $[0, \pi]$?

a) $-2/\pi$ b) $-1/\pi$ c) 0
 d) $1/\pi$ e) $2/\pi$

7. Let $f(x)$ be a continuous function. Which of the values below is NOT possible for the average of $(f(x))^2 e^x$ on the interval $[-1, 1]$?

a) -3 b) 0 c) 4
 d) **all** are possible e) **none** are possible

8. What is the value of $\int_0^{\pi} x^2 \cos(2x) dx$?

a) $-\frac{1}{2}$ b) 0 c) $\frac{1}{2}$
 d) $-\frac{\pi}{2}$ e) $\frac{\pi}{2}$

9. Compute the value of the definite integral: $\int_0^{\pi} \sin^3 x dx$

a) $\frac{\pi}{3}$ b) $\frac{2\pi}{3}$ c) 4π d) $\frac{4}{3}$
 e) $\frac{2}{3}$ f) $\frac{1}{3}$ g) 4 h) 3

Continue to Next Page

10. Compute the indefinite integral: $\int \sec^4 x \cdot \tan^2 x \, dx$

a) $\tan^4 x + \tan^2 x + C$

b) $\tan^5 x + \tan^3 x + C$

c) $\frac{\tan^4 x}{4} + \frac{\tan^2 x}{2} + C$

d) $\frac{\sec^5 x}{5} + \frac{\sec^3 x}{3} + C$

e) $\frac{\sec^4 x}{4} + \frac{\sec^2 x}{2} + C$

f) $\frac{\tan^5 x}{5} + \frac{\tan^3 x}{3} + C$

g) $\sec^4 x + \sec^2 x + C$

h) $\sec^5 x + \sec^3 x + C$

11. Compute the value of the definite integral: $\int_1^e x^3 \ln(x) \, dx$.

a) $(1 - 4e^4)/16$

b) $(1 + 4e^4)/16$

c) $(1 - 3e^4)/16$

d) $(1 + 3e^4)/16$

e) $(1 - e^4)/16$

f) $(1 + e^4)/16$

12. Compute the indefinite integral: $\int \sqrt{3 - x^2} \, dx$

a) $3 \sin^{-1} \frac{x}{\sqrt{3}} + x\sqrt{3 - x^2} + C$

b) $\frac{1}{2} \sin^{-1} \frac{x}{\sqrt{3}} + \frac{3}{2} x\sqrt{3 - x^2} + C$

c) $\frac{3}{2} \sin^{-1} x + \frac{1}{2} x\sqrt{3 - x^2} + C$

d) $\frac{\sqrt{3}}{2} \sin^{-1} \frac{x}{3} + \frac{1}{2} x\sqrt{3 - x^2} + C$

e) $\frac{3}{2} \sin^{-1} \frac{x}{3} + \frac{\sqrt{3}}{2} x\sqrt{3 - x^2} + C$

f) $\frac{3}{2} \sin^{-1} \frac{x}{\sqrt{3}} + \frac{1}{2} x\sqrt{3 - x^2} + C$

g) $\sin^{-1} x + x\sqrt{3 - x^2} + C$

h) $\frac{3}{2} \sin^{-1} \frac{x}{3} + \frac{3}{2} x\sqrt{3 - x^2} + C$

END OF EXAM