MATH 22 PRACTICE EXAM ON VOLUMES

Name:

Section:

Instructions:

(1) Books, notes, and calculators are not permitted.
(2) Simplify as instructed. On some problems, unsimplified correct answers will not receive full credit.
(3) Show your work as instructed. On some problems, correct answers without justification will not receive full credit.

(1)

(2)

(3)

(4)

(5)

(6)

Total

Problem 1. (5 pts.) Circle the correct answer. There will be no partial credit. You do not need to show your work.

Which of the following integrals gives the volume of the solid obtained by rotating the region bounded by the curves $y = e^{x^2}$ and $y = ex^2$, $-1 \leq x \leq 1$ about the x-axis?

A. $\pi \int_0^1 (e^{2x^2} - e^2x^4)\, dx$.

B. $2\pi \int_0^1 (e^{2x^2} - e^2x^4)\, dx$.

C. $2\pi \int_{-1}^1 (e^{x^2} - ex^2)\, dx$.

D. $2\pi \int_0^1 (e^{x^2} - ex^2)\, dx$.

E. None of these.

Problem 2. (5 pts.) Circle the correct answer. There will be no partial credit. You do not need to show your work.

Which of the following is equal to the volume of the solid obtained by rotating the region bounded by the curves $y = x^2$ and $y = \sqrt{x}$ about the x-axis?

A. $3\pi/10$.

B. $3\pi/5$.

C. $9\pi/100$.

D. $9\pi/50$.

E. None of these.

Problem 3. (15 pts.) Sketch the region bounded by the curves $y = x^2 + 1$ and $y = 9 - x^2$. Find the volume of the solid obtained by rotating this region about the line $y = -1$. Simplify your answer.

Problem 4. (15 pts.) Sketch the region bounded by the curves $x = 1 + y^2$ and $y = x - 3$. Find the volume of the solid obtained by rotating this region about the y-axis. Simplify your answer.

Problem 5. (15 pts.) Sketch the region bounded by the curve $x = 9 - y^2$ and the y-axis. Find the volume of the solid obtained by rotating this region about the line $x = -1$. Simplify your answer.

Problem 6. (15 pts.) Sketch the region bounded by the curve $y = 1 - x^2$ and the x-axis. Find the volume of the solid whose base is this region, and whose cross-sections perpendicular to the y-axis are squares. Simplify your answer.