

Name: _____

Math 221 Section 16279

Practice Exam 3

November 16, 2009

Follow the instructions for each question and show enough of your work so that I can follow your thought process. If I can't read your work or answer, you will receive little or no credit!

For problems 1-4, integrate the following definite or indefinite integrals.

1. $\int 3x^4 (4x^5 + 2)^{10} dx$

2. $\int_{-2}^{-1} x\sqrt{x+2}dx$

3. $\int (y-4)\sqrt[3]{y^2-8y}dy$

4. $\int_1^3 \left(x^4 - 5x^2 + \frac{1}{x^2} - 7\right) dx$

5. If $f(x)$ is continuous and $\int_0^4 f(x)dx = 10$, find $\int_0^2 f(2x)dx$

6. Determine if the following integral converges or diverges: $\int_0^\infty \frac{x}{(x^2 + 2)^2}dx$

For problems 7 and 8, find the area between the indicated curves.

7. The curves, $y = x^3$, $y^3 = x$.

8. The curves, $y = x^2 - 2x$, $y = x + 4$

9. Find the volume of the region, E , enclosed by the curves $y = x$ and $y = x^3$ rotated about the x - axis by the washer/disk method. (Set up the integral only, do NOT evaluate it.)

10. Find the volume of the solid obtained by rotating the region bounded by $y = x^2 - x^3$ and $y = 0$ about the line $x = 2$ using shells. (Set up the integral only, do NOT evaluate it.)

11. Let $F(x) = \int_0^{\tan x} \sqrt{1 + \sqrt{t}} dt$, find $F'(x)$.

12. Use Simpson's Rule to find $\int_1^2 \frac{1}{1+x} dx$, using $n = 8$.

13. Let $h(r) = \int_a^{p(r)} \varphi(x)dx$, find $h'(r)$.

14. Compute the following two limits: $\lim_{x \rightarrow \infty} \tan^{-1}(x)$, and $\lim_{x \rightarrow -\infty} \tan^{-1}(x)$