

Exam 3

A. Miller

Fall 91

Math 221

- 1.(8%) Find the area of the region bounded by the curves $y = x^2$ and $x + y = 6$.
- 2.(9%) Find the x coordinate of the center of mass of a thin homogeneous plate covering the region bounded by the curves $y = x^2$ and $x + y = 6$.
- 3.(8%) Find $\frac{dy}{dx}$ if $y = \log_2(x^4)$.
- 4.(9%) Find the volume generated by revolving the region bounded by $y = \sqrt{x}$ and the lines $y = 1$ and $x = 0$ about the line $y = 1$.
- 5.(8%) Find $\frac{dy}{dx}$ if $y = 2^{\ln(x)}$.
- 6.(9%) Find the volume generated by revolving the set of all points (x, y) with $0 \leq x \leq 1$ and $0 \leq y \leq x^2 - x^3$ about the y -axis.
- 7.(8%) Find $\frac{dy}{dx}$ if $y = \arctan(\ln(x))$.
- 8.(9%) Find the area of the surface generated by revolving the curve $x = y^2 + 1$ for $1 \leq y \leq 2$, about the x -axis.
- 9.(8%) Find the average value of the function $\ln(x)/x$ on the interval $[1, 5]$.
- 10.(8%) Evaluate the integral $\int_0^2 \frac{x^2}{1+x^6} dx$.
- 11.(8%) Evaluate the integral $\int_0^1 \frac{e^x}{1+e^x} dx$.
- 12.(8%) In Benjamin Franklin's will he estimated that his bequest of 1000 pounds would grow to 131,000 pounds in 100 years. He was using an annual rate of 5% and compounding once each year. What rate of interest per year compounding continuously for 100 years would multiply the original amount to 131,000 pounds?

Answers Exam 3 Fall 91

1. $20^{\frac{5}{6}}$
2. $-\frac{1}{2}$
3. $\frac{\frac{4}{x}}{\ln(2)}$
4. $\frac{1}{6}\pi$
5. $\ln 2 \cdot x^{\ln 2 - 1}$
6. $\frac{\pi}{10}$
7. $\frac{1}{x(1+(\ln(x))^2)}$
8. $\frac{\pi}{6}(17^{3/2} - 5^{3/2})$
9. $\frac{(\ln 5)^2}{8}$
10. $\frac{1}{3} \arctan(8)$
11. $\ln(2 + e)$
12. $i = \frac{1}{100} \ln(131) = .048752$