

Name _____ ID _____

MATH 172
Section 502

EXAM 2

Fall 1999
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1-7	/63
8	/15
9	/15
10	/15

Multiple Choice: (9 points each)

1. $\int_0^2 \frac{x}{4-x^2} dx =$

- a. $-\infty$
- b. $-\ln 4$
- c. 0
- d. $\ln 4$
- e. ∞

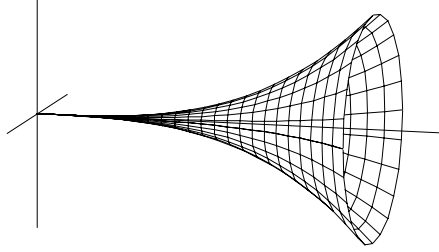
2. $\int_2^{\infty} \frac{2+x}{x^3} dx =$

- a. $-\infty$
- b. $\frac{3}{4}$
- c. 1
- d. 2
- e. ∞

3. If it requires 12 lb of force to stretch a spring from rest to 3 ft, how much work will it take to stretch it from 3 ft to 6 ft?

- a. 12 ft-lb
- b. 18 ft-lb
- c. 36 ft-lb
- d. 54 ft-lb
- e. 72 ft-lb

4. The curve $y = \frac{1}{3}x^3$ for $0 \leq x \leq 1$ is rotated about the x -axis. Find the integral which gives the area of the surface swept out.



- a. $\int_0^1 2\pi \frac{1}{3}x^3 \sqrt{1+x^4} dx$
 b. $\int_0^1 \sqrt{1+x^4} dx$
 c. $\int_0^1 2\pi x \sqrt{1+x^4} dx$
 d. $\int_0^1 \frac{1}{3}x^3 \sqrt{1+x^4} dx$
 e. $\int_0^1 x \sqrt{1+x^4} dx$
5. Given the partial fraction expansion $\frac{x+3}{x(x+1)^2} = \frac{3}{x} - \frac{3}{x+1} - \frac{2}{(x+1)^2}$, compute $\int_1^2 \frac{x+3}{x(x+1)^2} dx$.
- a. $3 \ln 2 + 6 \ln 3 + \frac{1}{3}$
 b. $3 \ln 2 - 3 \ln 3 + \frac{2}{3}$
 c. $6 \ln 2 - 3 \ln 3 - \frac{1}{3}$
 d. $10 \ln 2 - 7 \ln 3$
 e. $10 \ln 2 - 7 \ln 3 - \frac{1}{2}$

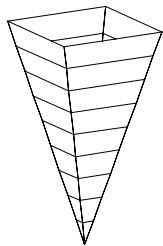
6. Use the Trapezoid Rule with $n = 3$ to approximate $\int_0^9 \frac{x}{x+3} dx$.

- a. $\frac{9}{10}$
- b. $9 - \ln 2 - \ln 5$
- c. $\frac{37}{24}$
- d. $\frac{33}{16}$
- e. $\frac{37}{8}$

7. The function $x(t) = Ae^{5t} + \frac{3}{5}$ satisfies which equation?

- a. $\frac{dx}{dt} = 3x - 5$
- b. $\frac{dx}{dt} = 5x + 3$
- c. $\frac{dx}{dt} = 5x - 3$
- d. $\frac{dx}{dt} = -5x - 3$
- e. $\frac{dx}{dt} = -3x - 5$

8. (15 points) A square pyramid with the point at the bottom is 10 cm high and the square at the top is 5 cm on a side. If the pyramid is filled with water, how much work does it take to pump the water out the top? $\rho = 1 \frac{\text{gm}}{\text{cm}^3}$ $g = 980 \frac{\text{cm}}{\text{sec}^2}$



9. (15 points) Find the partial fraction expansion for $\frac{3x^2 - 10x + 4}{x(x - 2)^2}$.

10. (15 points) Solve the initial value problem $\frac{dy}{dx} = \frac{\sin x}{y^2}$ with $y(0) = 3$.