

Name _____

MATH 172

Exam 1

Spring 2018

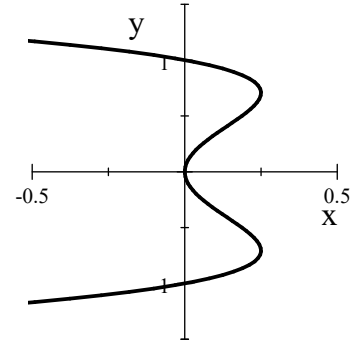
Sections 501/502 (circle one)

P. Yasskin

Multiple Choice: (5 points each. No part credit.)

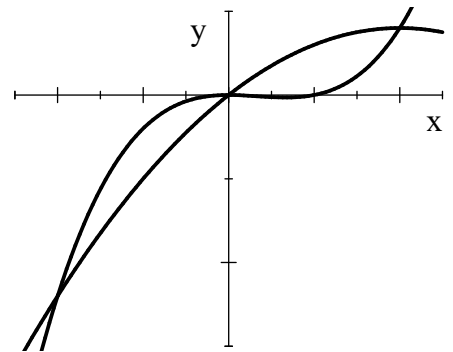
1. Find the area between $x = y^2 - y^4$ and the y -axis.

- a. $\frac{2}{15}$
- b. $\frac{4}{15}$
- c. $\frac{8}{15}$
- d. 4
- e. 8



2. Find the total area between $y = x^3 - x^2$ and $y = 4x - x^2$.

- a. 2
- b. 4
- c. 8
- d. 18
- e. 24



1-10	/50	13	/15
11	/10	14	/10
12	/10	15	/10
		Total	/105

3. The temperature of a 5 cm bar is $T = 1 + x^4$ where x is measured from one end.

Find the average temperature of the bar.

- a. $\frac{129}{4}$
- b. $\frac{629}{4}$
- c. 126
- d. 130
- e. 630

4. Compute $\int_1^2 x \ln(x^2) dx$.

- a. $4 \ln 4 - 4$
- b. $4 \ln 4 - 3$
- c. $2 \ln 4 - 2$
- d. $2 \ln 4 - \frac{3}{2}$
- e. $4 \ln 4 - \frac{3}{2}$

5. Compute $\int_0^{\pi/2} \sin^2 x \cos^3 x dx$

- a. $\frac{1}{15}$
- b. $\frac{2}{15}$
- c. $\frac{4}{15}$
- d. $\frac{8}{15}$
- e. $\frac{16}{15}$

6. Find the mass of a 6 meter bar whose density is $\rho(x) = 4 + 2x$ where x is measured (in meters) from one end.
- a. 16
 - b. 60
 - c. 24
 - d. 21
 - e. 36
7. Find the center of mass of a 6 meter bar whose density is $\rho(x) = 4 + 2x$ where x is measured (in meters) from one end.
- a. 108
 - b. 216
 - c. $\frac{5}{18}$
 - d. $\frac{5}{36}$
 - e. $\frac{18}{5}$
8. Compute $\int_0^{\pi/4} \sec^6 \theta d\theta$
- a. $\frac{28}{15}$
 - b. $\frac{14}{15}$
 - c. $\frac{4}{3}$
 - d. $\frac{2}{3}$
 - e. $\frac{1}{6}$

9. Compute $\int_0^{\pi/3} \sec^5 \theta \tan \theta \, d\theta$

- a. 1
- b. $\frac{7}{3}$
- c. 5
- d. $\frac{31}{5}$
- e. $\frac{63}{5}$

10. Compute $\int_0^3 \frac{x^2}{(x^2 + 9)^2} \, dx$.

- a. $\frac{\pi}{24} - \frac{1}{12}$
- b. $\frac{\pi}{12} - \frac{1}{6}$
- c. $\frac{\pi}{6} - \frac{1}{3}$
- d. $\frac{1}{96}\pi$
- e. $\frac{1}{288}\pi$

Work Out: (Points indicated. Part credit possible. Show all work.)

11. (10 points) Compute $\int_0^{\sqrt{\pi/2}} x^3 \cos(x^2) dx$.

12. (10 points) Compute $I = \int e^{-x} \sin(3x) dx$.

13. (15 points) Consider the curve $y = \frac{2}{3}x^{3/2}$ for $0 \leq x \leq 3$.

a. Find the arclength.

b. If the curve is revolved about the y -axis, find the area of the surface swept out.

14. (10 points) Compute $\int_0^1 \frac{1}{x^2 - 9} dx$.

15. (10 points) Compute $\int \frac{1}{x^2 \sqrt{9x^2 - 1}} dx$. Check your answer!