

Name \_\_\_\_\_

MATH 172

Exam 1

Spring 2020

Sections 501

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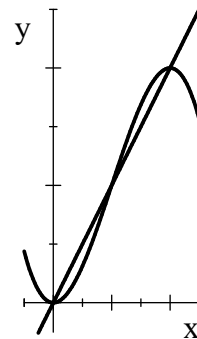
Multiple Choice: (4 points each. No part credit.)

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

- a.  $\frac{1}{5}$
- b.  $\frac{2}{5}$
- c.  $\frac{4}{5}$
- d.  $\frac{5}{2}$
- e. 5

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

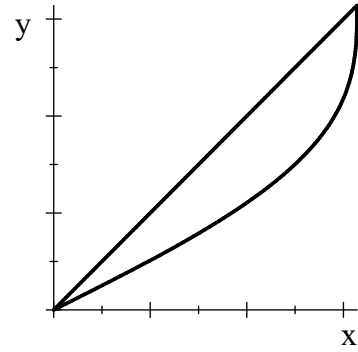
- a. 0
- b.  $\frac{1}{4}$
- c.  $\frac{1}{2}$
- d. 1
- e. 2



1-14	/56	16	/18
15	/17	17	/15
		Total	/106

3. Find the area between  $x = y + \sin y$  and  $x = y$ .

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



4. Find the area between  $y = 3x\sqrt{16+x^2}$  and the  $x$ -axis for  $0 \leq x \leq 3$

- a. 61
- b. 9
- c.  $3^{3/2}$
- d. 54
- e. 244

5. Compute  $\int_0^1 2xe^{2x} dx$ .

- a.  $\frac{1}{2}(e^2 - 1)$
- b.  $\frac{1}{2}(e^2 + 1)$
- c.  $\frac{1}{2}e^2$
- d.  $\frac{1}{2}(3e^2 - 1)$
- e.  $\frac{3}{2}e^2$

6. Find the average value of the function  $f(x) = \sin x$  on the interval  $[0, \pi]$ .

- a.  $\frac{2}{\pi}$
- b.  $\frac{1}{\pi}$
- c.  $2\pi$
- d.  $\pi$
- e.  $2$

7. Find the length of the parametric curve  $x = \theta$  and  $y = \ln(\cos \theta)$  for  $0 \leq \theta \leq \frac{\pi}{4}$ .

- a.  $\ln|\sqrt{2} + 1| + 1$
- b.  $\ln|\sqrt{2} - 1| + 1$
- c.  $\ln|\sqrt{2} + 1| - 1$
- d.  $\ln|\sqrt{2} - 1|$
- e.  $\ln|\sqrt{2} + 1|$

8. The curve  $(x, y) = \left(t + 1, \frac{t^2}{2} + t\right)$  for  $0 \leq t \leq 1$  is rotated about the  $y$ -axis. Find the surface area.

- a.  $\frac{2\pi}{3}$
- b.  $\frac{8\pi}{3} 5^{3/2}$
- c.  $\frac{2\pi}{3} (5^{3/2} - 2^{3/2})$
- d.  $\frac{8\pi}{3} (5^{3/2} - 1)$
- e.  $\frac{8\pi}{3} (5^{3/2} - 2^{3/2})$

9. Compute  $\int_1^2 x^3 \ln x dx$ .

a.  $2 \ln 2 - \frac{7}{8}$

b.  $2 \ln 2 - \frac{9}{8}$

c.  $2 \ln 2 - \frac{15}{16}$

d.  $4 \ln 2 - \frac{15}{16}$

e.  $4 \ln 2 - \frac{17}{16}$

10. Compute  $\int_{\pi/4}^{\pi/3} \tan^3 \theta \sec^2 \theta d\theta$ .

a. 2

b. 4

c. 20

d.  $\frac{1}{4}$

e.  $\frac{1}{2}$

11. Compute  $\int_0^{\pi} \cos^4 \theta d\theta$ .

a.  $\frac{3\pi}{16}$

b.  $\frac{5\pi}{16}$

c.  $\frac{5\pi}{8}$

d.  $\frac{3\pi}{8}$

e.  $\frac{3\pi}{4}$

12. Compute  $\int \frac{1}{(4-x^2)^{3/2}} dx$

a.  $\frac{1}{4\sqrt{4-x^2}} + C$

b.  $\frac{x}{4\sqrt{4-x^2}} + C$

c.  $\frac{1}{2\sqrt{4-x^2}} + C$

d.  $\frac{\sqrt{4-x^2}}{4x} + C$

e.  $\frac{\sqrt{4-x^2}}{2x} + C$

13. Compute  $\int 9x^2 \cos(3x) dx$ .

a.  $3x^2 \sin(3x) + 2x \cos(3x) + \frac{2}{3} \sin(3x) + C$

b.  $3x^2 \sin(3x) - 2x \cos(3x) - \frac{2}{3} \sin(3x) + C$

c.  $3x^2 \sin(3x) + 2x \cos(3x) - \frac{2}{3} \sin(3x) + C$

d.  $3x^2 \sin(3x) - 2x \cos(3x) + \frac{2}{3} \sin(3x) + C$



16. (18 points) Compute  $\int e^{4x} \cos 3x dx$ .

17. (15 points) Compute  $\int \frac{1}{x^2 \sqrt{x^2 - 4}} dx$ .