

MARK BOX		
PROBLEM	POINTS	
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
%	100	

NAME: _____

SSN: _____

please circle your section below

Section 003 (MW 9:05 pm)

or

Section 004 (MW 10:10 pm)

INSTRUCTIONS:

- (1) To receive credit you must:
 - (a) work in a logical fashion, show all your work, indicate your reasoning
 - (b) when applicable put your answer on/in the line/box provided
 - (c) if no such line/box is provided, then box your answer
- (2) The MARK BOX indicates the problems along with their points. Check that your copy of the exam has all of the problems.
- (3) You may **not** use a calculator, books, personal notes. Give exact answers: for example, write $\ln 2$ instead of .6931, write $\sqrt{2}$ instead of 1.414, write π instead of 3.1415, write $\frac{1}{3}$ instead of 0.3333.
- (4) During this exam, do not leave your seat. If you have a question, raise your hand. When you finish: turn your exam over, put your pencil down, and raise your hand.
- (5) This exam covers (from *Calculus* by Anton, Bivens, Davis 8th ed.):
Section 6.6, 6.8, 6.9, 7.1 – 7.4, 7.6, 7.7 .

Problem Inspiration:

1. homework problem § 6.6 # 55
2. homework problem § 6.9 # an additional problem
3. homework problem § 6.8 # 33
4. homework problem § 6.8 # 47
5. homework problem § 6.9 # 3
6. homework problem § 7.1 # 31 , actually problem § 7.1 # 32
7. homework problem § 7.2 # 7 , actually problem § 7.2 # 10
8. homework problem § 7.3 # 5 , actually problem § 7.3 # 6
9. homework problem § 7.4 # 7 , actually problem § 7.4 # 8
10. combines ideas from § 7.2 and 7.3

1. Use the Fundamental Theorem of Calculus to find:

$$\frac{d}{dx} \int_{17}^x e^{\sqrt{t+5}} dt =$$

2. Evaluate the below derivative.

$$\frac{d}{dx} 7^{(x^2)} =$$

3. Evaluate the below integral. (Hint: factor $3x + 6$.)

$$\int_{x=1}^{x=2} \frac{3x + 6}{\sqrt{x^2 + 4x + 7}} dx =$$

4. Evaluate the below integral. Your answer should be a real number and should not involve any log, trig, etc, functions.

$$\int_{x=\frac{-1}{\sqrt{3}}}^{x=0} \frac{dx}{1+9x^2} =$$

5. The Logarithmic Function Time.

5a. Fill in the one box. By definition, for $x > 0$,

$$\ln x = \int_1^{\square} \frac{dt}{t}.$$

5b. Let $\ln a = 3$ and $\ln c = 6$. Then

$$\int_1^{\frac{a}{c}} \frac{dt}{t} = \square.$$

Your answer should be a number and should not have a \ln , a , or c in it.

6. Find a vertical line $x = k$ that divides the area enclosed by

$$x = \sqrt{y} \quad \text{and} \quad x = 2 \quad \text{and} \quad y = 0$$

into two equal parts.

ANSWER: the vertical line is $x = \underline{\hspace{2cm}}$.

7. Let R be the region enclosed by

$$y = 9 - x^2 \quad \text{and} \quad y = 0 .$$

Let V be the volume of the solid obtained by revolving the region R about the x -axis.

7a. Make a rough sketch of the region R , labeling the important points.

7b. Using the disk/washer method, express the volume V as an integral (or maybe 2 integrals).

You do NOT have to evaluate the integral(s).

$V =$

8. Let R be the region enclosed by

$$y = \sqrt{x} \quad \text{and} \quad x = 4 \quad \text{and} \quad x = 9 \quad \text{and} \quad y = 0 .$$

Let V be the volume of the solid obtained by revolving the region R about the y -axis.

8a. Make a rough sketch of the region R , labeling the important points.

8b. Using the cylindrical shell method, express the volume V as an integral (or maybe 2 integrals).

You do NOT have to evaluate the integral(s).

V =

9. Let L be the arc length of the curve

$$x = \frac{y^4}{8} + \frac{y^{-2}}{4} \quad \text{from } y = 1 \quad \text{to} \quad y = 4 .$$

Express L as an integral You do NOT have to evaluate the integral.

ANSWER: L=

10. Let R be the region enclosed by

$$y = \frac{x}{2} \quad \text{and} \quad x = 2 \quad \text{and} \quad y = 0 .$$

Let V be the volume of the solid obtained by revolving the region R about the line $x = 3$.

10a Make a rough sketch of the region R , labeling the important points.

10b Using the disk/washer method, express the volume V as an integral (or maybe 2 integrals). You will have to use IDEAS from the shell method for when we rotated about a line other than the x or y axis. But do not use the shell method itself.

You do NOT have to evaluate the integral(s).

V =