

Name _____

DAY 1

Instructions

WRITE ANSWERS IN THE SPACES PROVIDED AND SHOW ALL WORK. Partial credit will not be given if work is not shown. Ask for extra paper if you need it. NOTHING ON THE EXTRA PAPER will be graded unless you explicitly write “see extra paper” on this exam paper AND you clearly indicate the problem number on the extra paper. Make sure your name is on any paper you want graded. CALCULATORS are **NOT** permitted on this part of the exam

ALL PAPERS (the exam and extra paper) will be collected at the end of the exam.

I. Evaluate the following integrals (4 points each)

1. $\int_{-1}^1 2x \sin(1 - x^2) dx$

2. $\int_1^9 (x - \frac{1}{\sqrt{x}}) dx$

II. Given that $\int_0^8 f(x) dx = 16$, find the following: (2 points each)

3. a. $\int_{-8}^8 f(x) dx$ if $f(x)$ is odd _____

b. $\int_{-8}^8 f(x) dx$ if $f(x)$ is even _____

III. Given that $f''(x) = 2x - 3$ and $f'(4) = 11$ and $f(0) = -5$: (5 points)

4. Find $f(x)$.

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IV. Integrate each of the following. (3 points each)

5. $\int (1-x)\sqrt{x} \, dx$

6. $\int \frac{x^3 + 5x^2 - 4}{x^2} \, dx$

7. $\int \frac{x^2 + 2x + 1}{x + 2} \, dx$

8. $\int \frac{x^2}{2x^3 - 4} \, dx$

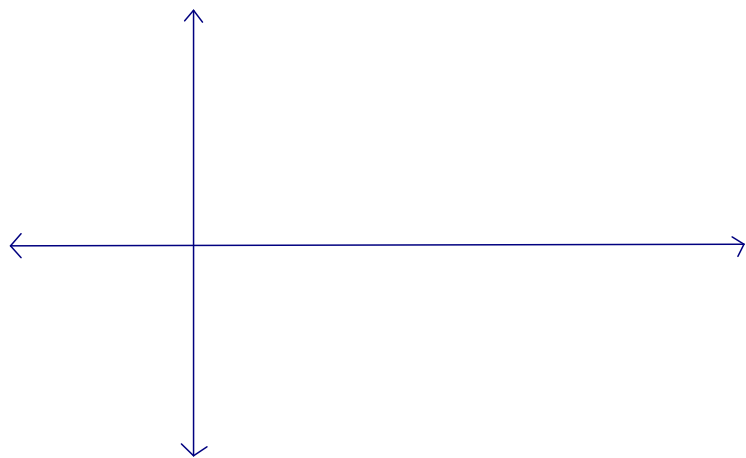
9. $\int x^2(1+x^3)^7 \, dx$

10. $\int (4x^2 + 3)^2 \, dx$

VI. Areas

11. Given the functions: $f(x) = -x^2 + 5x - 4$ $g(x) = -x - 4$

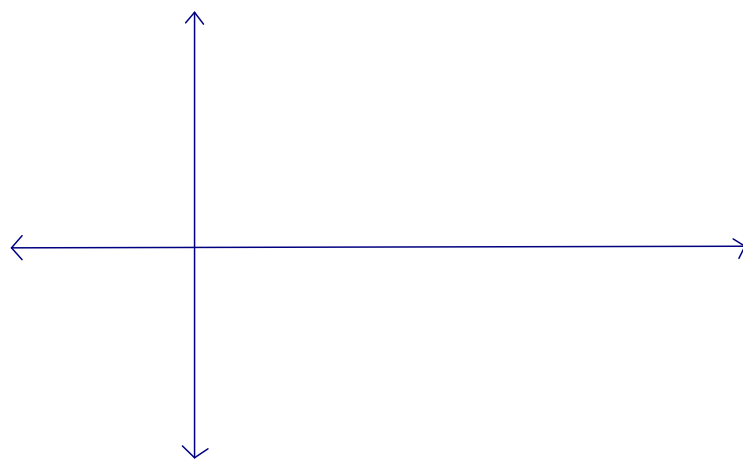
a. Find the points of intersection of the functions and sketch a graph of the functions. (4 points)



b. Find the area of the region bounded by the graphs. (6 points)

12. Given the functions: $f(x) = \sin x$ and $g(x) = \cos x$

a. Sketch a graph of the functions over the interval $0 \leq x \leq 2\pi$.



b. Find the area of the region bounded by the graphs over the interval $0 \leq x \leq \frac{\pi}{4}$.

Name _____

DAY 2***Instructions***

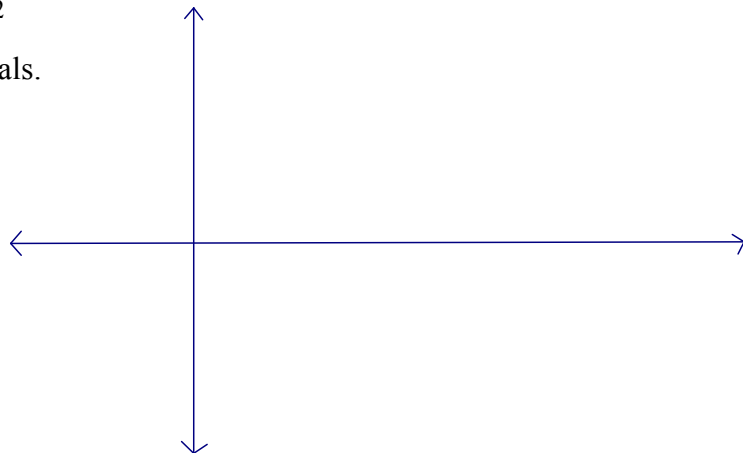
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CALCULATORS **are** permitted on this part of the exam MAKE SURE YOU ARE IN THE CORRECT MODE. If you use your calculator for something other than numeric calculations, make sure you make clear what your inputs are.

ALL PAPERS (the exam and extra paper) will be collected at the end of the exam.
(6 points)

1. Given the function: $f(x) = 9 - x^2$

a. Sketch a graph of the function $f(x) = 9 - x^2$ over the interval from 0 to 3 with $n = 6$ subintervals.



b. Use a left hand Reimann sum to approximate the area under the curve of the third rectangular region.

c. Show an exact calculation of the total area by using the Fundamental Theorem.

II. Integrate each of the following: (3 points each)

2. $\int \frac{e^{\frac{3}{x}}}{x^2} dx$

3. $\int \frac{1}{x} \cos(\ln x) dx$

4. $\int \frac{\ln x}{x} dx$

5. $\int -2e^{-2x} \sin e^{-2x} dx$

6. $\int \sqrt{1 - \sin x} \cdot \cos x dx$

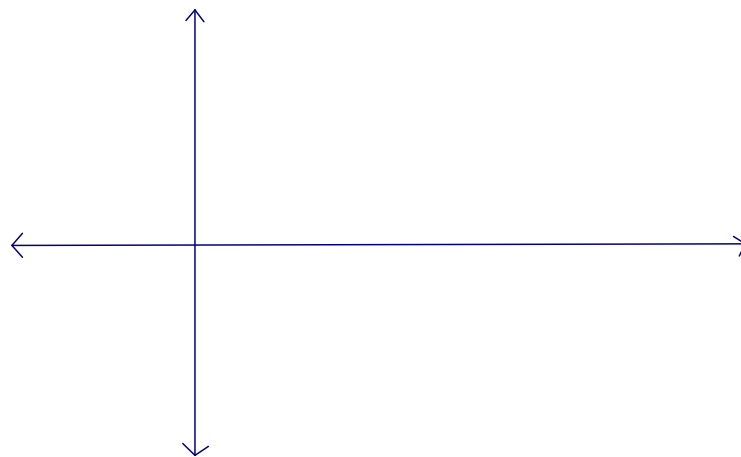
7. Find the consumer and producer surplus for the given functions:

Demand function: $p(x) = 500 - x$

Supply function: $p(x) = 1.25x + 162.5$

a. Find the point of equilibrium. (2 points)

b. Graph the functions and the line of equilibrium. (2 points)



c. Write an integral for the consumer surplus for this product and solve. (3 points)

d. Write an integral for the producer surplus for this product and solve.(3 points)

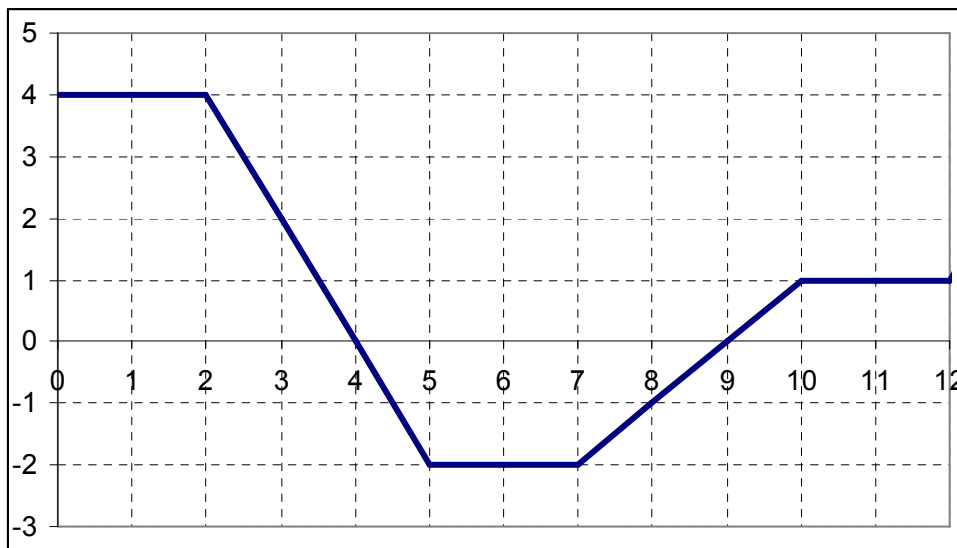
(3 points)

8. The sales of a seasonal product can be modeled by

$$N = 71.5 + 44.75 \cos \frac{\pi x}{6}$$

where N is measured in units of one thousand items and x is the time in months, with $x = 1$ representing the end of January. Write an integral that represents the **average** monthly sales between the end of January and the end of September and solve.

9. Use the graph of $f(x)$ below to find the following: (2 points each)



a. $\int_0^3 f(x) dx =$ _____

b. $\int_3^8 f(x) dx =$ _____