Worksheet 1: Area between curves

Due at the beginning of class on the day of Test 1

Direction: Solve the problems in this worksheet on separate sheets of paper. Write your solution neatly. Use standard size paper. Clearly label each problem, and include each problem in the correct order. No ragged edges. Staple multiple pages. At the top of the first page put your name, Math 2414, and the title of the worksheet. Show all work to justify your answer. Answer with insufficient work will receive no credit.

Problem 1: Find the area of a region between two curves

Sketch the region bounded by the graphs of the equations and find the area of the region

1. $y = \frac{1}{9x^2}, y = 1, x = 1, x = 2$
2. $f(x) = x^2 - 4x + 3$ and $g(x) = -x^2 + 2x + 3$.

Problem 2: Curves that intersect at more than two points

Sketch and find the area of the region bounded by the graphs of the functions

1. $f(x) = x^4 - 9x^2$ and $g(x) = x^3 - 9x$
2. $f(x) = \cos(x)$ and $g(x) = 2 - \cos(x)$, $0 \leq x \leq 2\pi$.

Problem 3: Regard x as a function of y

Sketch and find the area of the region bounded by the given graphs

1. $x = 1 - y^2$ and $x = y^2 - 1$
2. $4x + y^2 = 12$, $x = y$.

Problem 4: Application

In the following table (Larson-Calculus), y represents the percents of total income of the bottom x percents of the population.

x	10	20	30	40	50	60	70	80	90
y	3.35	6.07	9.17	13.39	19.45	28.03	39.77	55.28	75.12

1. Use a graphing calculator to find a quadratic function $y = f(x)$ that models the data.
2. The area between $y = f(x)$ and $y = x$, $0 \leq x \leq 100$ indicates a country's income inequality. Set up the integral and use the integration capability of the calculator to find the income inequality of this country.

Problem 5: Application

The following figure (Larson-Calculus) shows a concrete section for a new building.

1. Set up and evaluate the integral to find the area of the face of the section.
2. Find the volume of the section by multiplying the area by 2m. If one cubic meter of concrete weighs 5000 lbs, find the weight of the section.