

**MATH 16B:
FAKE TEST 2A**

SPRING 2007

- (1) a) Find the area of the region bounded by the x -axis and the graph of the function $f(x) = |3x - 9|$ on the interval $[1, 5]$.
b) Use the result you found in a) to determine the average value of the function f described above on $[1, 5]$.
c) Sketch the function f , its average value, and write a sentence which interprets your result.

- (2) Suppose that f is an odd function and g is an even function. Suppose further that we know

$$\int_1^2 f(x)dx = 3 \quad \text{and} \quad \int_0^3 g(x)dx = -2.$$

Calculate:

$$\int_{-1}^2 3f(x) + xdx$$

and

$$\int_{-3}^3 2g(x) - 4x^3 dx.$$

- (3) a) Sketch the region bounded by the curves $y = (x - 2)^2 + 2$, $y = -(x - 2)^2 + 4$, and the lines $x = 0$ and $x = 4$.
b) Set up an integral which calculates the area of the region drawn in a).
- (4) Consider the line segment which joins the point $(0, 0)$ and the point $(2, 5)$ in the plane.
a) Write a function of x which describes this line segment and use your result to calculate the volume of the solid obtained by revolving this line about the x -axis.
b) Write a function of y which describes this line segment and use your result to calculate the volume of the solid obtained by revolving this line about the y -axis.
c) Write a sentence which interprets why the answers you obtained in a) and b) are different.

(5) Integrate

$$\int \frac{2x}{\sqrt{3x-1}} dx$$

(6) Integrate

$$\int x (\cos(2x) - \ln[3x]) dx.$$

(7) Integrate

$$\int \sec(e^{-2x}) e^{-2x} dx.$$