

MATH 1080, SPRING 2006, HW SET 9

You need to show all your work and explain with following the guideline described in the class webpage to get the full credit. And please staple your HW papers.

HW 9 Due on Thursday 04/06/06

Before doing this HW, go over the definitions with examples given in class.

1. Let $f(x) = -2x + 4$ on $[0, 4]$.

- (1) Sketch the graph of f on the given domain.
- (2) Find the area of the region surrounded by the graph of f and the x -axis on the given domain by using the graph obtained above.
- (3) Find the followings:

(a) $\int_0^2 f(x)dx =$

(b) $\int_2^4 f(x)dx =$

(c) $\int_0^4 f(x)dx =$

2. Find the followings using the Fundamental Theorem of Calculus. (Show your work of finding $F(x)$

such that $F'(x) = f(x)$.)

(1) $\int_0^4 (-2x + 4)dx =$

(2) $\int_{-1}^1 (x^3 - x)dx =$

(3) $\int_1^3 \frac{1}{x^2}dx =$

3. Let $f(x) = x^3 - x^2 - 2x$.

- (1) Find the following by using the Fundamental Theorem of Calculus:

(a) $\int_{-1}^0 f(x)dx =$

(b) $\int_0^2 f(x)dx =$

(c) $\int_{-1}^2 f(x)dx =$

- (2) Sketch a rough graph of f by plotting x -intercepts (you don't have to find local extreme values).
- (3) Find the area of the region surrounded by the graph of f and the x -axis by using the Fundamental Theorem of Calculus (or using the answers obtained from the first part).

4. Find the area of the region surrounded by the graph $f(x) = -x^4 + 4x^3 - 4x^2$ and the x -axis. (Suggestion: Sketch the graph roughly to see where it is above or below x -axis and use the Fundamental Theorem of Calculus.)