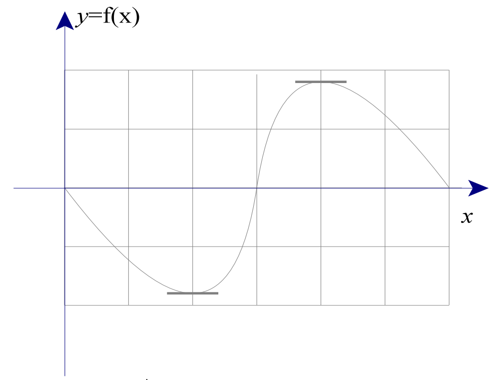
Math 001B Assignment 5.3 Name______________________________________

DIRECTIONS To receive full credit, you must provide complete legible solutions to the following problems in the space provided. Transfer all your answers to the space provided on the test paper.

1. Let f be a function whose domain is the closed interval [0,6]. The graph of f is shown in the figure.



Let $h(x) = \int_0^x f(t)dt, \quad 0 \le x \le 6$

a. Find $h(1) =$

b. Find $h'(4) =$

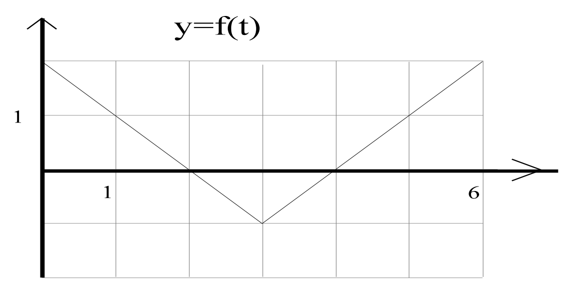
c. On what interval or intervals is the graph of h concave upward? Justify your answer. Ans____________________

d. Find the value of x at which h has a minimum on the closed interval [0,6]. Show the analysis that leads to your conclusions.

Ans____________________

2. Let f be a continuous function on the closed interval [1,3], and define F(x) by

Let $F(x) = \int_0^x f(t)dt, \quad 1 \le x \le 6$



a. Find $F(1) =$

b. Find $F(2) =$

c. Find $F(3) =$

a) Find an expression for F over the interval [1,6]. Ans____________________

3. You are given the following information $\int_0^{10} f(x)dx = 30,\ \int_4^{10} f(x)dx = 20,$

$Find\ \int_0^4 f(x)dx$ Ans______________

4. Use Part 1 of the Fundamental Theorem of Calculus to find the value of the derivative of the function f at $x = 1$.

a. $f(x) = \int_0^{x^2} \sqrt{t^2+1}dt$ Ans____________________

b. $f(x) = \int_{2x}^{x^2} \frac{1}{t}dt$ Ans____________________

5. For what value of c > – 1 does the integral below achieves a maximum value?

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