

Clearly indicate your final answer. Partial credit will NOT be given.

**Problem #1.** (2 points) If  $f(x)$  and  $g(x)$  are non-zero differentiable functions, then the derivative of the quotient  $F(x) = \frac{f(x)}{g(x)}$  is:

- (a)  $\frac{f'(x)g(x) - g'(x)f(x)}{f^2(x)}$     (b)  $\frac{g'(x)f(x) - f'(x)g(x)}{g^2(x)}$     (c)  $\frac{g(x)f'(x) + g'(x)f(x)}{f^2(x)}$     (d)  $\frac{g(x)f'(x) - f(x)g'(x)}{g^2(x)}$

**Problem #2.** (2 points) If  $f(x)$  is a function, such that  $f(-1) = -2$ ,  $f(0) = 3$  and  $f(1) = 1$ , then the definite integral  $\int_{-1}^1 f'(x)dx$  is equal to:

- (a) 1    (b) 2    (c) 3    (d) 4    (e) impossible to determine.

**Problem #3.** (2 points) Which of the following functions satisfies the equation  $\frac{dP}{dt} = 0.2P - 10$ ?

- (a)  $P(t) = 10 + e^{0.2t}$     (b)  $P(t) = 10 + e^{-0.2t}$     (c)  $P(t) = 50 - e^{0.2t}$   
(d)  $P(t) = 50e^{0.2t}$     (e)  $P(t) = 10 + 0.2e^t$ .

**Problem #4.** (2 points) A patient is given penicillin, which is eliminated from the body at a fixed rate of 20% each hour. The patient is given a dose of 500mg. At which of the following times is there between 75mg and 100mg penicillin left in the patient's system?

- (a) 5 hrs.    (b) 6 hrs.    (c) 7 hrs.    (d) 8 hrs.    (e) 9 hrs.

**Problem #5.** (2 points) If  $\int_0^5 f'(x)dx = 1$  and  $f(5) + f(0) = 5$ , then the product  $f(5)f(0)$  is:

- (a) 0    (b) 4    (c) 5    (d) 6    (e) impossible to determine.

**Problem #6.** (1 point) What is the value of the improper integral  $\int_1^{\infty} \frac{1}{x^2} dx$

- (a) 0    (b) 1    (c)  $\infty$     (d) -1    (e)  $-\infty$