DUE DATE: Name

## **Directions:**

- Read each problem carefully and use your knowledge of calculus to determine your answer.
- In order to receive FULL CREDIT you must either SHOW ALL WORK or EXPLAIN how you got your answer!! PLEASE NOTE: A multiple choice answer alone without any work will only receive half credit.
- 1) Let  $f(x) = \int_0^{x^2} e^{t^2+t} dt$ . Find f'(x).
- (B)  $2x e^{x^2(x^2+1)}$  (C)  $e^{x^4+x^2}$  (D)  $2e^{(x^2+x)}$  (E)  $2x e^{x^2+2x}$

- 2) What is the average value of  $y = x^2 \sqrt{x^3 + 1}$  on the interval [0, 2]?

3) What are all values of k for which  $\int_{-3}^{k} x^2 dx = 0$ ? Let F(x) be an antiderivative of  $\frac{(\ln x)^3}{x}$ . If F(1) = 0, then F(9) =

$$\int x \cos x \, dx =$$

6) If  $\frac{dy}{dx} = \sqrt{1 - y^2}$ , then  $\frac{d^2y}{dx^2} =$ 

- Use implicit differentiation to find  $\frac{dy}{dx}$  for the equation  $4y e^{xy} = 7$ .
- (A)  $-\frac{1}{4}e^{xy}$  (B)  $\frac{y}{x+4e^{-xy}}$  (C)  $-\frac{ye^{xy}}{xe^{xy}-4}$  (D)  $-\frac{y}{4}e^{xy}+7$  (E)  $\frac{7-ye^{xy}}{4+xe^{xy}}$

- Which of following is equal to  $\int_{1}^{3} (2x^2 5)^3 x \, dx$ ?

- (A)  $\frac{1}{4} \int_{1}^{3} u^{3} du$  (B)  $\frac{1}{4} \int_{2}^{13} u^{3} du$  (C)  $\int_{2}^{13} u^{3} du$  (D)  $4 \int_{1}^{3} u^{3} du$  (E)  $4 \int_{2}^{13} u^{3} du$

- Use partial fractions to evaluate  $\int_{3}^{5} \frac{4x 9}{2x^2 9x + 10} dx$

- (A)  $\ln 3 + \ln 5$  (B)  $2 \ln 3 + \ln 5$  (C)  $\ln 3 + 2 \ln 5$  (D)  $\ln 5 \ln 3$  (E)  $2 \ln 5 \ln 3$

- 10) The graph of  $f(x) = x^3 + x^2$  has a point of inflection at

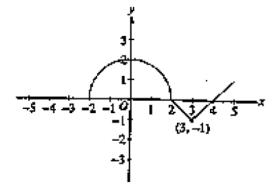
  - (A)  $x = \frac{1}{3}$  (B)  $x = -\frac{1}{3}$  (C)  $x = -\frac{2}{3}$  (D)  $x = \frac{2}{27}$  (E) x = 0

- 11) A particle starts at the point (5,0) at t=0 and moves along the x-axis in such a way that at time t > 0 its velocity v(t) is given by  $v(t) = \frac{t}{1 + t^2}$ .
  - Determine the maximum velocity attained by the particle. Justify your answer. (a)
  - Determine the position of the particle at t = 6. (b)
  - Find the limiting value of the velocity as t increases without bound. (c)
  - Does the particle ever pass the point (500,0)? Explain. (d)

12)

The graph of a function f consists of a semicircle and two line segments as shown below. Let g be the function given by  $\int\limits_0^x f(t)dt$ 

- a. Find g(3).
- b. Find all values of x on the open interval (-2,5) at which g has a relative maximum. Justify your answer.
- c. Write an equation for the line tangent to the graph of g at x = 3.
- d. Find the x-coordinate of each point of inflection of the graph of g on the open interval (-2,5). Justify your answer.



AP CALCULUS BC WEEKLY REVIEW #6