

PRINT NAME: \_\_\_\_\_

STUDENT ID NUMBER: \_\_\_\_\_

- (1) No books and notes are allowed.
- (2) You may use a scientific calculator and a notecard.
- (3) Write clearly and show your work in details.

Problem	Points	Score
1	15	
2	15	
3	30	
4	40	
Total	100	

(1) (15 points) The velocity of a car is given by  $v(t) = 50 + 3\sqrt{t}$ , where  $t$  is the time measured in hours and  $v(t)$  is measured in miles per hour.

(a) (10 points) Find the distance traveled by the car from  $t = 0$  to  $t = 4$ .

(b) (5 points) Find the average velocity of the car from  $t = 0$  to  $t = 4$ .

(2) (15 points) Estimate  $\int_0^{2\pi} \sin x dx$  using four subintervals with (a) right endpoints, (b) left endpoints and (c) midpoints.

(3) (30 points) Let  $f(t) = \int_1^{2t} x^{-1}e^x dx$ . Find  $f'(t)$  and  $f''(t)$ .

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(4) (40 points) Evaluate the following integrals.

(a) (10 points)  $\int_1^2 \frac{x}{1+x^2} dx$

(b) (10 points)  $\int_0^2 e^{3x} dx$

(c) (10 points)  $\int \sqrt[3]{x}(x + \sqrt{x})dx$

(d) (10 points)  $\int e^x \sqrt{e^x + 1} dx$