

HONOR 2201, CALCULUS FOR NON-SCIENCE MAJORS, QUIZ 5, 10/14/05

Name: Solution Student ID #: \_\_\_\_\_

1-3. Let  $C(q) = q^3 - 6q^2 + 9q$ , where  $1 \leq q \leq 5$  be the given cost function.

1.(4 pts) Find the average cost function  $a(q)$  in terms of  $q$  using the given  $C(q)$  above.

$$a(q) = \frac{C(q)}{q} = \boxed{q^2 - 6q + 9}$$

2.(4 pts) Find the marginal cost function in terms of  $q$  using the given  $C(q)$  above.

$$C'(q) = \boxed{3q^2 - 12q + 9}$$

3.(7 pts) Find the quantity  $q$  which minimizes the average cost and justify your answer.

$$a(q) = q^2 - 6q + 9,$$

$$a'(q) = 2q - 6 = 0. \Rightarrow q = 3.$$

Find the global minimum of  $a(q)$ . for  $1 \leq q \leq 5$ .

$$\Rightarrow \boxed{a(3) = 9 - 18 + 9 = 0}$$

$$a(1) = 1 - 6 + 9 = 4$$

$$a(5) = 25 - 30 + 9 = 4$$

$a(q)$  has minimum at  $\boxed{3} = q$   
 ( & the minimum is 0 )