MATH 1325

Chapter 11.6: Derivatives Of Products And Quotients

THE PRODUCT RULE:

$$f(x) = AB$$
$$f'(x) = A'B + AB'$$

GIVEN $f(x)$, FIND $f'(x)$.

$f(x) = (2x+4)(3x^2)$

$f(x) = (\sqrt{x}+3)(x^2-5x)$

THE QUOTIENT RULE:

$$f(x) = \frac{A}{B}$$

$$f'(x) = \frac{A'B - AB'}{B^2}$$

GIVEN $f(x)$, FIND $f'(x)$.

$f(x) = \dfrac{2x - 1}{4x + 3}$

$f(x) = \dfrac{x - 2x^2}{4x^2 + 1}$

$$f(x) = \frac{(3-4x)(5x+1)}{7x-9}$$

AVERAGE COST $\bar{C}(x) = \frac{C(x)}{x}$

MARGINAL AVERAGE COST $\bar{C}'(x)$

THE TOTAL COST IN DOLLARS TO MANUFACTURE X MOBIL PHONES IS GIVEN BY $C(x) = \frac{50x^2 + 30x + 4}{x + 2} + 80000$.

FIND THE FOLLOWING.

a) AVERAGE COST PER PHONE

b) AVERAGE COST PER PHONE AT PRODUCTIONS:

5000

10000

100000

c) MARGINAL AVERAGE COST

d) MARGINAL AVERAGE COST AT PRODUCTIONS:

500

1000

THE COST IN HUNDREDS OF DOLLARS FOR A FLOWER SHOP TO PRODUCE X-HUNDRED FLOWER ARRANGEMENTS IS GIVEN BY $C(X) = X^2 + 3X + 18$.

a) FIND THE MARGINAL COST AT A PRODUCTION LEVEL OF 200 ARRANGEMENTS.

b) FIND THE AVERAGE COST AT A PRODUCTION LEVEL OF 200 ARRANGEMENTS.

c) FIND THE MARGINAL AVERAGE COST AT PRODUCTION LEVELS OF 200 AND 500 ARRANGEMENTS.

d) FIND THE PRODUCTION LEVEL WHERE THE MARGINAL AVERAGE COST IS ZERO.