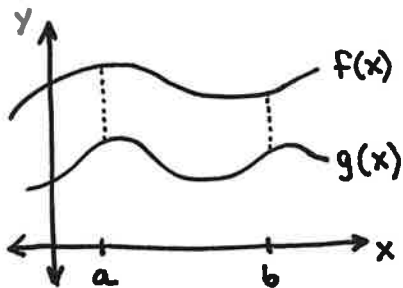


MATH 1325

Chapter 13.6: Applications Of Integrals

THE ANNUAL RATE OF REPAIR COSTS FOR A CAR IS GIVEN IN YEAR x BY $R(x) = 120e^{-.1x}$. FIND THE REPAIR COSTS FOR 1 YEAR AND 3 YEARS.

AREA BETWEEN TWO CURVES

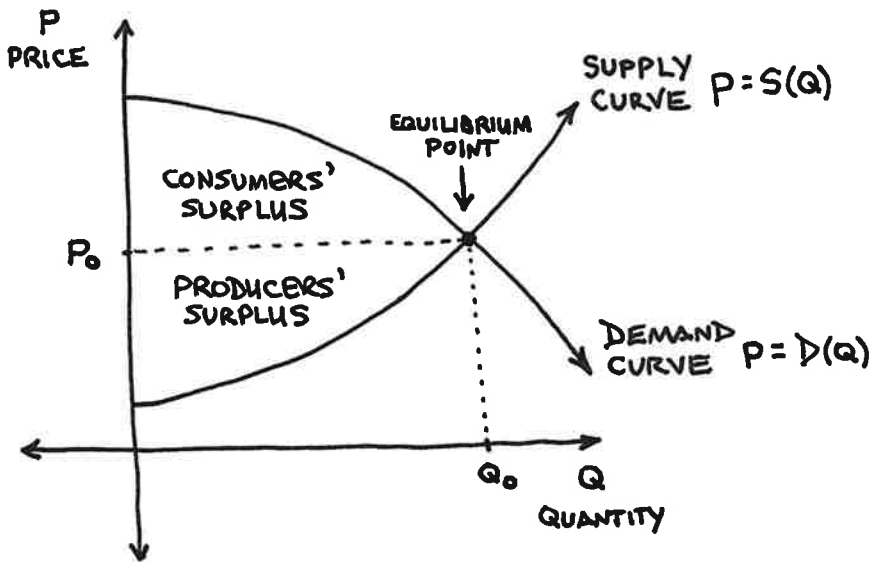


A COMPANY GENERATES REVENUE OVER 6 YEARS WITH $f(t) = -.4t^2 + 4.8t + 9$ AND INCURS COSTS WITH $g(t) = -.1t^2 + 2.2t + 5$. FIND THE PROFIT (IN MILLIONS OF DOLLARS) OVER THE 6 YEARS.

$$\begin{array}{l} \text{MARGINAL REVENUE: } R'(x) = -.3x^2 + 9x + 11 \\ \text{MARGINAL COST } C'(x) = 2x + 6 \end{array} \left. \vphantom{\begin{array}{l} R'(x) \\ C'(x) \end{array}} \right\} \begin{array}{l} \text{IN HUNDREDS OF DOLLARS} \\ \text{PER HUNDRED ITEMS} \end{array}$$

HOW MANY ITEMS SHOULD BE PRODUCED TO MAXIMIZE PROFIT?

WHAT WILL THE MAXIMUM PROFIT BE?



CONSUMERS' SURPLUS

$$\int_0^{Q_0} [D(Q) - P_0] dQ$$

PRODUCERS' SURPLUS

$$\int_0^{Q_0} [P_0 - S(Q)] dQ$$

THE PRICE (IN DOLLARS PER TON) FOR AN ITEM IS $D(Q) = 900 - 20Q - Q^2$ WHEN THE DEMAND IS Q TONS. THE PRICE (IN DOLLARS PER TON) IS $S(Q) = Q^2 + 10Q$ WHEN THE SUPPLY IS Q TONS.
FIND THE CONSUMERS' SURPLUS AND THE PRODUCERS' SURPLUS.