MAC 2233 Indefinite Integral Worksheet

1. (Armstrong & Davis, section 6.1 problem 61) The marginal revenue function for the FrontRide Bus Company is given by $R'(x) = 0.000045x^2 - 0.03x + 3.75, 0 \le x \le 500$.
   a. Knowing that $R(x) = 0$ when $x = 0$, recover the revenue function $R$.
   b. Find the price-demand function $p$ for the bus company.
   c. What should the price be when the demand is 100 passengers?

2. (Armstrong & Davis, section 6.1 problem 63) The marginal average cost function for producing $x$ promotional banners is given by $\bar{C}'(x) = -\frac{100}{x^2}, x > 0$.
   a. Knowing that it costs $2.50 per banner to produce 100 banners, recover the average cost function.
   b. Knowing the average cost function from part (a), find the cost function $C(x)$.
   c. Using the cost function from part (b), evaluate $C(100)$ and interpret.

3. (Tan, section 6.1 problem 65) Lorimar Watch Company manufactures travel clocks. The daily marginal cost function associated with producing these clocks is
$$C'(x) = 0.000009x^2 - 0.009x + 8$$
where $C'(x)$ is measured in dollars/unit and $x$ denotes the number of units produced. Management has determined that the daily fixed cost incurred in producing these clocks is $120. Find the total cost incurred by Lorimar in producing the first 500 travel clocks per day.

4. (Tan, section 6.1 problem 75) In a study conducted in 2000, the share of online advertisement, worldwide, as a percentage of the total ad market is expected to grow at the rate of $R(t) = -0.033t^2 + 0.3428t + 0.07$ $(0 \le t \le 6)$ percent/year at time $t$ (in years), with $t = 0$ corresponding to the beginning of 2000. The online ad market at the beginning of 2000 was 2.9% of the total ad market.
   a. What is the projected online ad market share at any time $t$?
   b. What is the projected online ad market share at the beginning of 2005?

5. (Tan, section 6.2 problem 57) The rate of change of the unit price $p$ (in dollars) of Apex women's boots is given by
$$p'(x) = -\frac{250x}{(16 + x^2)^{3/2}}$$
where $x$ is the quantity demanded daily in units of a hundred. Find the demand function for these boots if the quantity demanded daily is 300 pairs ($x = 300$) when the unit price is $50/pair.