MA205 - Integral Calculus
Lesson 10: Problem Solving Lab II
Class Problems

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1. $\displaystyle\int_1^8 \left(\frac{1}{\sqrt[3]{t}} + t\right)^2 dt$

2. The marginal cost function, $C'(t)$, is defined to be the rate of change of the production cost function. If the marginal cost of manufacturing x units of a product is $C'(x) = 0.0006x^2 - 1.5x + 8$ (measured in dollars per unit produced) and the fixed start up cost is $C(0) = \$1,500,000$, find the cost of producing the first 2000 units and then determine the particular cost function that describes the cost of producing any amount of items.

3. $\displaystyle\int u^\pi + \frac{\pi}{u} + t\, du$

4. The total cost of producing x items is given by the cost function $C(x) = 246.76 + \int_0^x 5t dt$. Determine the fixed cost and the marginal cost of producing the tenth item.

5. America Online's total revenue (including revenue from subscriptions) was flowing in at a rate of approximately $R_{total} = 0.4t^2 + 0.1t + 2$ billion dollars per year ($0 \leq t \leq 2.5$), where t is time in years since January 2005. During the same period, revenue from subscriptions alone flowed in at a rate of approximately $R_{subs} = 0.2t^2 + 0.2t + 1$ billion dollars per year. Determine America Online's revenue from sources other than subscriptions for the first year.

6. $\int_0^1 \frac{11 + e^{2s}}{e^s} ds$