HOMEWORK 6 - MATH 112

DUE DATE: Friday, November 11

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Read each problem very carefully before starting to solve it. One part of each problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Compute the following indefinite integrals:
   (a) $\int (\sqrt[3]{x} - \frac{1}{2\sqrt[3]{x}})dx$
   (b) $\int (\sqrt[3]{x^2} + 1)dx$
   (c) $\int \frac{2x^3+1}{x^3}dx$

2. Find the particular solution $y = f(x)$ that satisfies the differential equation and the initial condition:
   (a) $f'(x) = 3\sqrt{x} + 3,\ f(1) = 4.$
   (b) $f'(x) = \frac{2-x}{x^3}, x > 0,\ f(2) = \frac{3}{4}.$

3. A company produces a product for which the marginal cost of producing x units is $C' = 2x-12$ and the fixed costs are \$125.
   (a) Find the total cost function and the average cost function.
   (b) Find the total cosr of producing 50 units.

4. Use the general power rule $\int f(x)^n f'(x)dx = \frac{f(x)^{n+1}}{n+1} + c$ to compute the following integrals:
   (a) $\int \sqrt{5x^2 - 4}(10x)dx$
   (b) $\int \frac{x^2}{(1+x^3)^2}dx$

5. Use formal substitution to compute the following integrals:
   (a) $\int x^2(2 - 3x^3)^{3/2}dx$
   (b) $\int \frac{x}{\sqrt{x^2+25}}dx$
   (c) $\int \frac{x^2+1}{\sqrt{x^3+3x+4}}dx$

6. Compute the following indefinite integrals.
   (a) $\int 9xe^{-x^2}dx$
   (b) $\int (x^2 + 2x)e^{x^3+3x^2-1}dx$

7. Compute the following indefinite integrals.
   (a) $\int \frac{x+3}{x^2+6x+7}dx$
   (b) $\int \frac{1}{x\ln x}dx$
   (c) $\int \frac{e^x}{1+e^x}dx$

8. Find the equation of the function f with derivative $f'(x) = \frac{x^2+4x+3}{x-1}$, whose graph passes through the point $(2, 4)$.