1. (50 pts) Differentiate the function.

   (a) $f(x) = 0.02e^x - 2x^3 - 4x^2 + 6x - 10$

   (b) $y = x^{3/5} - 3\sqrt[5]{x^2} + 4\ln x$

   (c) $f(x) = (\sqrt{x} + 1)(e^x + 1)$

   (d) $g(x) = (2x - 3\ln x)(x + 1/x)$

   (e) $y = \dfrac{e^x}{1 - x^2}$

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

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

   (h) $y = \dfrac{\ln(x^2 + 1)}{e^x + e^{-x}}$

   (i) $y = \sqrt{x^3 e^{x^7}}$

   (j) $f(x) = \log_5(x^4 + x^2 + 3)$

2. (10 pts) Sketch the graph of the function $f(x) = 8x^3 - 24x^2 + 18x + 6$. Specify the relative maximum, relative minimum and inflection point on the graph.

3. (10 pts) Sketch the graph of the function $f(x) = \dfrac{x^2 + 2x - 4}{x^2}$. Find all the asymptotes.

4. (10 pts) Consider the function $f(x) = x^4 - 8x^2 + 3$ on $[-3, 3]$. Find the absolute maximum and absolute minimum.

5. (10 pts) A bus company charges \$10 per person for a sightseeing trip if 30 people travel in a group. If for each person above 30 the company reduces the charge per person by \$0.20, how many people will maximize the total revenue for the bus company?

6. (10 pts) Find the antiderivatives.

   (a) $\int x^2 + 5/x + 4e^x dx$

   (b) $\int \dfrac{x^{2/3} + x^{-2/3}}{x^{4/3}} dx$