1. Evaluate the following problems: (8% each)
   a. \[ \int \frac{e^x + e^{-x}}{e^x - e^{-x}} \, dx; \]
   b. \[ \int_0^4 |x^2 - 4x + 3| \, dx; \]
   c. \[ \int \frac{1}{x(3 - 2x)^3} \, dx; \]
   d. \[ \lim_{x \to 3} f(x) = \begin{cases} \frac{x + 2}{2}, & x \leq 3; \\ \frac{12 - 2x}{3}, & x > 3; \end{cases} \]
   e. Differentiate \[ f(x) = \frac{(2x - 3)^3}{\sqrt{4x - 9}}. \]

2. The equation \( s(t) = -16t^2 + 48t + 160 \) represents the position (in feet) above ground of a ball after it is thrown into the air from the top of a tower.
   a. Find the height of the tower. (3%)
   b. Find the maximum height reached by the ball. (3%)
   c. Find the time when the ball hits the ground. (3%)
   d. Find the velocity with which the ball hits the ground. (3%)

3. Find \[ d^2 y / dx^2 \] for \( x^2 + y^2 = 25 \). (12%)

4. Find the average value of \( f(x) = 3x^2 - 2x \) on \([1, 4]\). (12%)

5. Find the local extrema, if any, of \( f(x, y) = x^3 - 4xy + 2y^2 \). (12%)

6. Find the power series for \( f(x) = e^{2x+1} \). (12%)