1. (2 points)

   (a) Find the indefinite integral: \( \int (35x^6 - 12x^3 + 12x^2 - 1) \, dx \).

   (b) Find the definite integral: \( \int_0^1 (35x^6 - 12x^3 + 12x^2 - 1) \, dx \).

2. (2 points)

   (a) Find the indefinite integral: \( \int \left( 5e^x + \frac{x^2 + 2x}{x^3} \right) \, dx \).

   (b) Find the definite integral: \( \int_1^3 \left( 5e^x + \frac{x^2 + 2x}{x^3} \right) \, dx \).

3. (2 points)

   (a) Find the indefinite integral: \( \int \left( \frac{5}{x} - \frac{2}{\sqrt{x}} \right) \, dx \).

   (b) Find the definite integral: \( \int_1^4 \left( \frac{5}{x} - \frac{2}{\sqrt{x}} \right) \, dx \).

4. Find the integral: \( \int_{-2}^2 (x^{13} + 4x^7 - x^3 + 2x) \, dx \).

5. Find the integral: \( \int_{-4}^{10} |t| \, dt \).

   \textit{Hint: Think of the integral as the area under the curve.}
6. (2 points) Suppose that $F(x) = \int_{2}^{x} (t^2 - 1)e^{t^2+1} \, dt$.

(a) On which intervals is $F(x)$ increasing? On which intervals is $F(x)$ decreasing?

(b) On which intervals is $F(x)$ concave up? On which intervals is $F(x)$ concave down?

7. Suppose that $G(x) = \int_{2}^{\sqrt{x}} 4te^{2t^2} \, dt$. Find $G'(x)$.

8. Determine the average value of $f(x) = 6x^2 + 2x - 3$ on the interval $[-2, 4]$.

9. Find the indefinite integral using substitution: $\int (2t + 3)^4 \, dt$.

10. Find the indefinite integral using substitution: $\int (2x + 2)e^{x^2+2x+5} \, dx$.

11. Suppose that an object is dropped from the top of a cliff. The object’s velocity in feet per second is given by $v(t) = -12t - 5$. If the object lands on the ground at the bottom of the cliff in 9 seconds, how high is the cliff?