All work must be shown on a separate piece a paper.

1. Find the indefinite integral \( \int (2x^4 - 5 + \sec^2 x) \, dx \)

2. Find the particular solution that satisfies the differential equation and initial condition. 
   \( f''(x) = 24x, \quad f'(-1) = 7, \quad f(1) = -4 \)

3. Find the sum \( \sum_{i=0}^{4} (i^2 + i - 2) \)

4. Use the limit process to find the area of the region bounded by the graph of the function and the x-axis over the given interval. 
   \( y = 5 - x^2 \quad [-2, 1] \)

5. Find the limit \( \lim_{n \to \infty} \sum_{i=1}^{n} \left[ \frac{4(i-1)}{n} \right]^2 \left( \frac{4}{n} \right) \)

6. Use the Fundamental Theorem of Calculus to evaluate \( \int_{-2}^{3} (2x^2 - 1) \, dx \)

7. Use the Fundamental Theorem of Calculus to evaluate \( \int_{\pi/4}^{\pi/2} \sin x \, dx \)

8. Find the average value of \( f(x) = 3x^2 \) on \([0, 2]\).

9. Find the value of \( c \) guaranteed by the Mean Value Theorem for Integrals for \( f(x) = 2x + 8 \) on the interval \([1, 4]\).

10. Evaluate the integral \( \int 6x^2 \sqrt{x^3 + 5} \, dx \)

11. Evaluate the integral \( \int \left( \frac{x + 4}{(x - 1)^3} \right) \, dx \)

12. Use the Trapezoidal Rule and Simpson’s Rule with \( n = 4 \) to approximate \( \int_{-2}^{0} \left( \frac{1}{(x-1)^2} \right) \, dx \). Then find the actual value using the Fundamental Theorem of Calculus.