Show all of your work in your blue book for each problem. Work only one problem per side of the page. Box in your answers. GOOD LUCK!

1. Given \( f(x) = x^2 + 2 \) on the interval \( 1 \leq x \leq 3 \), compute the Riemann sum using right endpoints with \( n = 4 \). Is this an overestimate or an underestimate?

2. Find the area of the region bounded by the curve \( f(x) = 4x - x^2 \) and the line \( y = 3 \).

3. Determine the average value of \( f(x) = e^{x-4} \) over the interval \( x = 5 \) and \( x = 7 \).

4. Compute each of the following:
   (a) \( \int (5x^2 - \frac{6}{x}) \, dx \)
   (b) \( \int (7x + 2)^2 \, dx \)

5. Calculate \( \int_{1}^{7} \frac{1}{x^2} \, dx \).

6. Determine the following integrals by making the appropriate substitutions:
   (a) \( \int \frac{x^2}{\sqrt{x^2 + 4}} \, dx \)
   (b) \( \int_{1}^{2} 3x^2 \cdot (x^3 - 3)^5 \, dx \)

7. Set up the definite integral that gives the area of the region between \( y = x^2 - 5x \) and the x-axis from \( x = 2 \) and \( x = 6 \). Just set up the integral – do not solve.

8. Find the volume generated by revolving \( y = 4 - x \) around the x-axis from 1 to 2.