1. Estimate the following definite integrals using 5 rectangles with equal bases and the indicated method.

   (a) \[ \int_{1}^{11} x^2 + 2x \, dx \], midpoint method.

   (b) \[ \int_{0}^{2} 5x + 3 \, dx \], left endpoint.

   (c) \[ \int_{3}^{8} x^3 \, dx \], right endpoint.

2. Compute these integrals.

   (a) \[ \int_{1}^{A} 18(3x + 4)^5 \, dx \]

   (b) \[ \int_{0}^{J} 6x^2e^x^3 \, dx \]

3. Compute the following if \( f(x) = \begin{cases} 3x - 5 & \text{if } x > 2 \\ x^2 - 3 & \text{if } x \leq 2 \end{cases} \)

   (a) \[ \int_{-2}^{1} f(x) \, dx = \]

   (b) \[ \int_{0}^{5} f(x) \, dx = \]

4. Compute the following to at least 4 decimal digits.

   (a) \[ \int_{-4}^{3} e^{-x^2} \, dx = \]

   (b) \[ \int_{1}^{8} \frac{4x^3 + 9x + 2}{x^4 + 4x^2 + 50} \, dx = \]

5. Find the area between these functions on the given intervals.

   (a) \( y = xe^{x^2} \) and the x-axis \((y = 0)\) on \([-1, 2]\)

   (b) \( y = x^3 \) and \( y = (x + 3)^{(1/3)} \) on \([-1, 5]\)

6. Find the area bounded by \( y = e^{(x-3)} \) and \( y = 2x + 1 \).

7. The profit function, in dollars, for a video game company is given by \( P(x) = -0.001x^3 + 15x^2 - 3x - 6000 \) where \( x \) is the number of video games in thousands.

   NOTE: Part A and Part B are not the same question.

   (a) Find the average profit on the interval from where 25,000 to 45,000 games are sold.

   (b) Find the average profit if 70,000 games are sold.

   Give your answer in dollars/thousand items.