Calculus II Optional Take-Home Test 1

Number of questions—8

Directions: Solve each of the following problems using separate paper, while clearly indicating each problem number when solving. Irrelevant work will detract from your score, while answers without work shown will be awarded no credit. Answers with partially correct work will receive partial credit. Each problem is worth 12.5 points. You must work alone, but you may use a graphing calculator as a supplement to your own work if you indicate the steps used. You may not use a phone, computer, computational intelligence, AI, or other tools to assist you in solving the problems.

1. Approximate the area between the x-axis and $f(x) = 3^x$ from $x = -2$ to $x = 2$ using a left Riemann sum with 4 equal subdivisions.

2. Write $\displaystyle\int_{-1}^{5} (x + 2)\, dx$ as the limit of a Riemann sum. Do not evaluate the limit.

3. Find $g'(x)$ if $g(x) = \displaystyle\int_{0}^{\sqrt{x}} \cos t \, dt$.

4. Evaluate $\displaystyle\int_{3}^{6} \frac{2 + x^3}{x^4}\, dx$.

5. Evaluate $\displaystyle\int 2x^2 (x^3 + 2)^5 \, dx$.

6. Evaluate $\displaystyle\int_{0}^{\pi/3} \sec^2 x \tan x \, dx$.

7. The velocity of a particle moving along the x-axis is $v(t) = \dfrac{2}{\sqrt{t}}$ ft/s. At $t = 3$ s, its position is 1 ft. What is the position of the particle at any time t?

8. Find the area of the region enclosed by the curves $y = \sin\dfrac{\pi x}{2}$ and $y = x^3$.