

Problem number:	1	2	3	4	5	6	7	8
Points available:	5	5	15	15	15	15	15	15

- Select the correct method for solving the integral $\int \frac{\sin \alpha \cos \alpha}{1 + \cos^2 \alpha} d\alpha$, and fill in the blank.

 - substitution with $w = \underline{\hspace{2cm}}$ and $dw = \underline{\hspace{2cm}}$
 - integration by parts with $u = \underline{\hspace{2cm}}$ and $v' = \underline{\hspace{2cm}}$
 - trig substitution with $\alpha = \underline{\hspace{2cm}}$
 - no listed method applies

- Select the correct method for solving the integral $\int \sqrt{y^2 - 2y + 1}(y - 1) dy$, and fill in the blank.

 - substitution with $w = \underline{\hspace{2cm}}$ and $dw = \underline{\hspace{2cm}}$
 - integration by parts with $u = \underline{\hspace{2cm}}$ and $v' = \underline{\hspace{2cm}}$
 - trig substitution with $\alpha = \underline{\hspace{2cm}}$
 - no listed method applies

- Estimate $\int_0^1 \cos(x^2) dx$ using TRAP(4). From a graph of the integrand, decide whether your answer is an underestimate or an overestimate.

- First make a substitution and then use integration by parts to evaluate the integral $\int_1^4 e^{\sqrt{x}} dx$.

- Find the area of the region bounded by the curves $y = \sin(x)$, $y = \sin^3(x)$, $x = 0$, and $x = \frac{\pi}{2}$.
Do not use tables.

- Suppose that $f(1) = 2$, $f(4) = 7$, $f'(1) = 5$, $f'(4) = 3$, and f'' is continuous. Find the value of $\int_1^4 x f''(x) dx$.

- Find $\int \frac{1}{x^2 \sqrt{x^2 + 4}} dx$.

- Evaluate the definite integral $\int_{-2}^0 \frac{2x + 4}{x^2 + 4x + 5} dx$.