

Name:

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(Solve Q1, Q2 and exactly one among Q3, Q4).

Q1. Consider the solid produced by revolving the area enclosed by the curves $x = y^2 + 2$ and $x = 6$, about the line $x = 1$. Write two formulas to find its volume (a) by the washer method, (b) by the method of cylindrical shells. Do not evaluate the integrals.

Q2. Evaluate the integral $\int \sin^2 2x \cos 5x dx$.

Q3. Evaluate the integral $\int \cos(\ln x) dx$.

(Hint: first make a substitution, and then use integration by parts. Or, for an extra bonus, do not use a substitution!)

Q4. Use trigonometric substitution to evaluate the integral

$$\int \frac{6dx}{(9x^2 + 1)^2}.$$