1. Compute the following integral:

\[ \int_1^4 \sqrt{t} \ln t \, dt \]
2. Compute the following integral:

\[ \int_{0}^{\pi/4} \tan^4 \theta \sec^6 \theta \, d\theta \]
3. Compute the following integral:

\[ \int \frac{10}{(x-1)(x^2+9)} \, dx \]
4. Compute the following integral:

\[ \int \frac{1}{(5 - 4x - x^2)^{5/2}} \, dx \]
5. (a) Set up (but do not solve) the integral for the arc length along the curve \( x = y + y^3 \) from \( y = 1 \) to \( y = 4 \).

(b) Set up (but do not solve) the integral for the surface area of the surface obtained by rotating the curve given by

\[
x = a \cos^3 t, \quad y = a \sin^3 t, \quad 0 \leq t \leq \pi/2
\]

about the \( x \)-axis. Here \( a \) is an arbitrary constant.
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