Let $I = \int_{1}^{4} \frac{1}{x} \, dx$.

A. Use the Fundamental Theorem of Calculus to evaluate $I$ exactly.

B. Write out the approximating sums

$L_3,$

$R_3,$

$T_3,$

and $M_3$.

C. Compute the approximation errors

$|I - L_3|,$

$|I - R_3|,$

$|I - T_3|,$

and $|I - M_3|$.

D. What is the approximation error made by $S_6$?