If \( I = \int_1^5 \frac{1}{x} \, dx \), the Fundamental Theorem of Calculus provides a value of \( \ln(5) \) for \( I \), which is approximately 1.609. On Quiz #2, you computed \( L_4 = 2.08 \), \( R_4 = 1.28 \), \( T_4 = 1.68 \) and the approximation errors, \( |I - L_4| = 0.471 \), \( |I - R_4| = 0.329 \), and \( |I - T_4| = 0.071 \). According to Theorem 3 of the text, these approximation errors are bounded by:

\[
|I - L_n| \leq \frac{K_1(b-a)³}{2n}, \quad |I - R_n| \leq \frac{K_1(b-a)³}{2n}, \quad |I - T_n| \leq \frac{K_2(b-a)²}{12n²},
\]

where \( K_1 \) and \( K_2 \) are any upper bounds on \([a,b]\) for \(|f'(x)|\) and \(|f''(x)|\) respectively, \( n \) is the number of subintervals, and \( a \) and \( b \) are the limits of integration.

A. If \( f(x) = \frac{1}{x} \), \(|f'(x)| = \) ________________.

   Compute an appropriate value for \( K_1 = \) ________________.

   For \( n = 4, a = 1, b = 5 \), \( \frac{K_1(b-a)³}{2n} = \) ________________.

   Confirm that \( |I - L_n| \leq \frac{K_1(b-a)³}{2n} \) for \( n = 4, a = 1, b = 5 \).

   Confirm that \( |I - R_n| \leq \frac{K_1(b-a)³}{2n} \) for \( n = 4, a = 1, b = 5 \).

B. If \( f(x) = \frac{1}{x} \), \(|f''(x)| = \) ________________.

   Compute an appropriate value for \( K_2 = \) ________________.

   For \( n = 4, a = 1, b = 5 \), \( \frac{K_2(b-a)²}{12n²} = \) ________________.
Confirm that $|I - T_0| \leq \frac{K_2(b - c)^b}{12n^a}$ for $n = 4$, $a = 1$, $b = 5$. 