1. The graph below depicts the velocity (in mph) of a bike over a period of 10 hours. The distance traveled by the car in those 10 hours can be calculated by finding the area under the curve. Use the trapezoid rule with 5 intervals (i.e., \( n = 5 \)) to estimate the distance traveled.

\[
\begin{align*}
T_5 &= \sum_{i=1}^{5} \frac{1}{2} (f(x_{i-1}) + f(x_i)) \Delta x, \\
\Delta x &= \frac{10-0}{5} = 2 \\
&= \frac{1}{2} (3 + 9)(2) + \frac{1}{2} (9 + 16)(2) + \frac{1}{2} (16 + 11)(2) + \frac{1}{2} (11 + 19)(2) + \frac{1}{2} (19 + 18) \\
&= 12 + 25 + 27 + 30 + 37 = 131
\end{align*}
\]
2. Recall the formulas:

\[ |I - L_n| \leq \frac{K_1(b-a)^2}{2n} \]
\[ |I - R_n| \leq \frac{K_1(b-a)^2}{2n} \]
\[ |I - T_n| \leq \frac{K_2(b-a)^3}{12n^2} \]
\[ |I - M_n| \leq \frac{K_2(b-a)^3}{24n^2} \]

Let \( I = \int_{-1}^{2.75} f(x) \, dx \). Below are two graphs. The one on the left is a graph of \( f'(x) \). The one on the right is a graph of \( f''(x) \).

What is the smallest value of \( n \) that guarantees \( |I - M_n| \leq 0.001 \)?

(2) \( n = 94 \)

\[ \frac{K_2(b-a)^3}{24n^2} \leq 0.001 \]

\[ \frac{4(2.75 - (-1))^3}{24n^2} \leq 0.001 \]

\[ \frac{52.73}{6n^2} \leq 0.001 \]

\[ 52.734 \leq 6n^2 \]

\[ 87.89 \leq n^2 \]

\[ 93.75 \leq n \]

\[ n = 94 \]