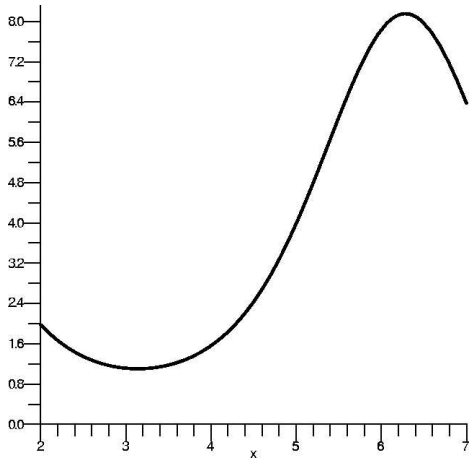
Problem statement Suppose f is defined by $f(x) = 3e^{\cos x}$. `Maple` produced graphs of f and its first four derivatives on the interval $[2, 7]$ (be careful when examining the derivative graphs – look carefully at the vertical scales!). The graph of f is to the right, and the graphs of the first four derivatives of f are on the back of this page. You should assume that the graphs are correct for this problem.

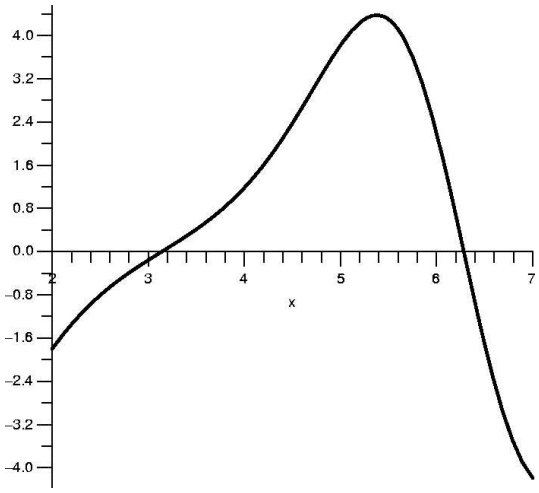


Suppose I is the value of $\displaystyle\int_2^7 f(x)\,dx$.

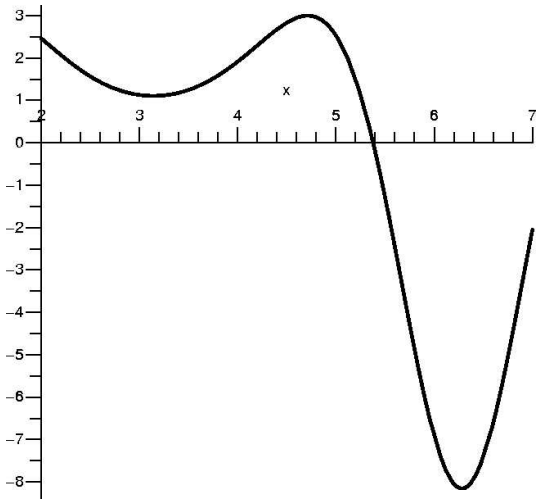
a) Use the graph of f alone to estimate I.

b) Use the information in the graphs to tell how many subdivisions N are needed so that the Trapezoid Rule approximation T_N will approximate I with error $< 10^{-5}$.

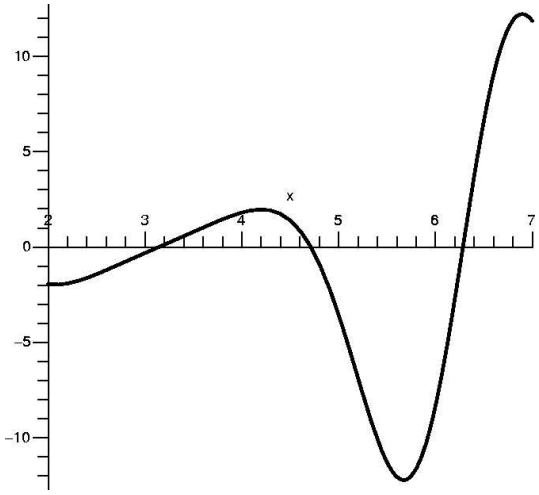
c) Use the information in the graphs to tell how many subdivisions N are needed so that the Simpson's Rule approximation S_N will approximate I with error $< 10^{-5}$.



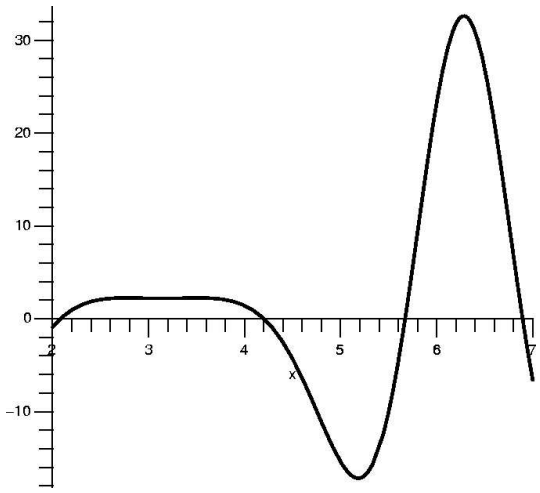
Graph of f'



Graph of f''



Graph of $f^{(3)}$



Graph of $f^{(4)}$