8. [8 points] The function

\[ F(x) = \int_0^x \sqrt{1 + 9t^4} \, dt. \]

computes the arc length of the graph of the function \( y = t^3 \) from \( t = 0 \) to \( t = x \).

a. [4 points] Approximate the value of \( F(\frac{1}{2}) \), the arc length of the curve \( y = t^3 \) for \( 0 \leq t \leq \frac{1}{2} \), using \( \text{RIGHT}(2), \text{LEFT}(2), \text{TRAP}(2) \) and \( \text{MID}(2) \). Write each term of each sum to receive full credit.

b. [2 points] Which approximation \( \text{RIGHT} \) or \( \text{LEFT} \) is guaranteed to give an underestimate for \( F(\frac{1}{2}) \)? Justify.

c. [2 points] Find \( F'(1) \).