NAME:

Show ALL your work CAREFULLY.

(a) Use the method of substitution to evaluate the following indefinite integral. Be sure to indicate the substitution you use.

\[
\int \frac{\cos \sqrt{x}}{\sqrt{x}} \, dx.
\]

Use the substitution \( u = \sqrt{x} \). It follows that \( du = \frac{dx}{2\sqrt{x}} \). Thus,

\[
\int \frac{\cos \sqrt{x}}{\sqrt{x}} \, dx = \int 2 \cos u \, du = 2 \sin u + C = 2 \sin \sqrt{x} + C.
\]

(b) The graph of the function \( f \) is given below. Over the interval \([0, 2]\), find \( L_2, R_2, T_2, \) and \( M_2 \).

Note that \( f(0) = 0, f\left(\frac{1}{2}\right) = \frac{1}{2}, f(1) = 1, f\left(\frac{3}{2}\right) = 0, f(2) = -1 \) and \( \Delta x = 1 \). It follows that \( L_2 = (0) \cdot 1 + (1) \cdot 1 = 1, R_2 = (1) \cdot 1 + (-1) \cdot 1 = 0, T_2 = \frac{1}{2} (L_2 + R_2) = \frac{1}{2}, \) and \( M_2 = \left(\frac{1}{2}\right) \cdot 1 + (0) \cdot 1 = \frac{1}{2} \).