5. [16 points] Suppose that \( f(x) \) is a function with the following properties:

- \( \int_0^1 f(x) \, dx = -5 \).
- \( \int_0^3 f'(x) \, dx = 10 \).
- The average value of \( f(x) \) on \([1, 1.5]\) is \(-4\).
- \( \int_2^4 xf'(x) \, dx = 8 \).

In addition, a table of values for \( f(x) \) is given below.

\[
\begin{array}{cccccc}
 x & 0 & 1 & 2 & 3 & 4 \\
 f(x) & -7 & -2 & -2 & m & 0 \\
\end{array}
\]

Calculate (a)-(d) exactly. Show your work and do not write any decimal approximations.

a. [4 points] \( m = \)

b. [4 points] \( \int_0^{1.5} f(x) \, dx = \)

c. [4 points] \( \int_2^4 f(x) \, dx = \)

d. [4 points] \( \int_4^{16} f'(\sqrt{x}) \, dx = \)