1. [13 points] Suppose that $f$ is a twice-differentiable, function that satisfies

\[ f(0) = 1 \quad f(2) = 2 \quad f(4) = 4 \quad f'(2) = 3 \]

\[ \int_0^2 f(x) \, dx = 5 \quad \int_2^4 f(x) \, dx = 7. \]

Evaluate the following integrals.

a. [4 points] \[ \int_0^2 xf'(x) \, dx \]

b. [4 points] \[ \int_{\sqrt{2}}^2 xf'(x^2) \, dx \]

c. [5 points] \[ \int_0^2 x^3 f'(x^2) \, dx \]