

**Problem statement** Suppose that  $f$  is a continuous function (defined for all  $x$ ) and that the values of the following integrals are known:

$$\int_0^1 f(x) dx = 5; \quad \int_{-1}^1 f(x) dx = 3; \quad \int_0^2 f(x) dx = 8; \quad \int_0^4 f(x) dx = 11.$$

Evaluate these integrals:

a)  $\int_0^2 f(2x) dx$       b)  $\int_0^\pi \sin x f(\cos x) dx$       c)  $\int_2^3 xf(8-x^2) dx.$

**Hint** Use substitutions, such as  $u = \cos x$  in b).