

4) If  $f$  is continuous and  $\int_0^4 f(x) dx = 16$ , find  $\int_0^2 xf(x^2) dx$ .

$$u = x^2$$

$$du = 2x dx$$

$$\frac{1}{2} du = x dx$$

if

$$x=0 \text{ then } u=0$$

$$x=2 \text{ then } u=4$$

$$\begin{aligned} \int_0^2 xf(x^2) dx &= \int_{x=0}^{x=2} \frac{1}{2} f(u) du \\ &= \frac{1}{2} \int_0^4 f(u) du = \frac{1}{2} (16) = 8 \end{aligned}$$