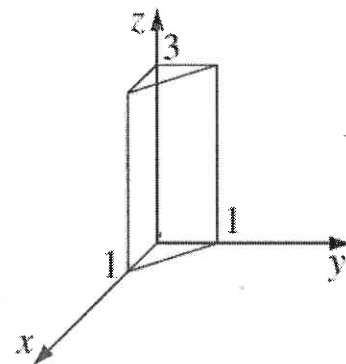


Example 1.8. Calculate the volume integral of $T = xyz^2$ over the prism in Fig. 1.24.



General expression from triple integrals.

$$\int_0^3 \int_0^1 \int_0^{1-y} T(x, y, z) \, dx \, dy \, dz$$

$$= \int_0^3 \int_0^1 \int_0^{1-y} xyz^2 \, dx \, dy \, dz$$

$$= \int_0^3 z^2 \, dz \int_0^1 \int_0^{1-y} xy \, dx \, dy$$

$$= \frac{1}{3} z^3 \Big|_0^3 \cdot \int_0^1 \frac{1}{2} (1-y)^2 y \, dy$$

$$= \frac{9}{2} \cdot \frac{1}{12} = \frac{3}{8}$$

$$\int_a^b \int_{p(z)}^{q(z)} \int_{r(y,z)}^{s(y,z)} T(x, y, z) \, dx \, dy \, dz$$