Exercises

1. Evaluate the following triple integrals:

(1) $\displaystyle\int_0^1 \int_0^2 \int_1^2 xyz^2 \, dx \, dy \, dz$ (2) $\displaystyle\int_0^1 \int_1^2 \int_2^3 (x + y + z) \, dz \, dy \, dx$

(3) $\displaystyle\int_0^a \int_0^a \int_0^a (x^2 + y^2 + z^2) \, dx \, dy \, dz$

(4) $\displaystyle\int_0^a \int_0^a \int_0^a (yz + zx + xy) \, dx \, dy \, dz$

(5) $\displaystyle\int_0^1 \int_0^1 \int_0^y xyz \, dx \, dy \, dz$ (6) $\displaystyle\int_0^1 \int_0^1 \int_{\sqrt{x^2+y^2}}^2 xyz \, dz \, dy \, dx$

(7) $\displaystyle\int_0^1 \int_0^{x^2} \int_0^{x+y} (x - 2y + z) \, dz \, dy \, dx$

(8) $\displaystyle\int_0^a \int_0^{a-x} \int_0^{a-x-y} (x^2 + y^2 + z^2) \, dz \, dy \, dx$

(9) $\displaystyle\int_1^3 \int_{1/x}^1 \int_0^{\sqrt{xy}} xyz \, dz \, dy \, dx$ (10) $\displaystyle\int_1^e \int_1^{\log y} \int_1^{e^x} \log z \, dz \, dx \, dy$

(11) $\displaystyle\int_0^{\log 2} \int_0^x \int_0^{x+\log y} e^{x+y+z} \, dz \, dy \, dx$