

Hwk on Triple integrals

① Evaluate :

$$(a) \int_0^3 \int_0^2 \int_0^1 (x+y+z) dx dy dz$$

$$(b) \int_0^1 \int_0^x \int_0^{xy} x dz dy dx$$

$$(c) \int_1^4 \int_0^1 \int_0^x 2z e^{-x^2} dy dx dz$$

② use a triple integral to find the volume of the solid bounded by the given graphs :

$$(a) x = 4 - y^2, z = 0, z = x$$

$$(b) x^2 + y^2 + z^2 = a^2$$

$$(c) z = 4 - x^2, y = 4 - x^2, \text{ first octant}$$

Find the mass and center of mass Coordinate specified for the solid bounded by the given graphs :

$$(a) \text{ Find } \bar{x} \text{ using } \rho(x,y,z) = k, 2x + 3y + 6z = 12, x = 0, \\ y = 0, z = 0$$

(over)

(b) Find \bar{z} using $\rho(x, y, z) = kx$; $z = 4 - x$, $t = 0$,
 $y = 0$, $y = 4$, $x = 0$

Answers for Hwk on Triple integrals

① (a) 18

(b) $\frac{1}{10}$

(c) $\frac{15}{2} \left(1 - \frac{1}{e}\right) \doteq 4.74$

② (a) $\frac{256}{15}$

(b) $\frac{4\pi a^3}{3}$

(c) $\frac{256}{15}$

③ (a) $m = 8k, \bar{x} = \frac{3}{2}$

(b) $m = \frac{128k}{3}, \bar{z} = 1$