$\overline{x} = \underbrace{\sum_{i=1}^{n} m_{i} x_{i}}_{\text{Preview from Page 8}} \text{e.co.uk}$ Preview from 8 of m_{i}^{2}

 $m_i x_i$ — moment of mass of the *i*th particle with respect to the origin

$$M_0 = \sum_{i=1}^{n} m_i x_i$$
 — moment of mass of the system with respect to the origin

$$M = \sum_{i=1}^{n} m_i$$
 – total mass of the system

Preview from Notesale.co.uk Preview from 18 of 72 Page 18 of 72

$$\overline{x} = \frac{\int_0^8 x \left(\frac{3}{8}x + 2\right) dx}{\int_0^8 \left(\frac{3}{8}x + 2\right) dx}$$

$$\overline{x} = \frac{\sum_{i=1}^{n} m_i x_i}{\text{fwom Notesale.co}} = \frac{\sum_{i=1}^{n} m_i y_i}{\sum_{i=1}^{n} m_i}$$
Preview $\sum_{i=1}^{n} m_i$

 $M_y = \sum_{i=1}^{n} m_i x_i$ — moment of mass of the system with respect to the y — axis.

 $M_x = \sum_{i=1}^{n} m_i y_i$ — moment of mass of the system with respect to the x — axis.

Preview from Motesale.co.uk $\overline{y} = \frac{\sum_{i=1}^{n} m_i y_i}{\sum_{i=1}^{n} m_i}$ $\overline{y} = \frac{\sum_{i=1}^{n} m_i y_i}{\sum_{i=1}^{n} m_i}$

$$M = \sum_{i=1}^{n} m_i$$
 – total mass of the system.

vertical strips

vertical strips
$$A = \int_0^4 \left(\sqrt{x} - \frac{1}{2} x \right) dx$$

$$\text{centroid and } x \text{ Notes ale. co}$$

$$\text{centroid and } x \text{ Notes ale. co}$$

$$\text{centroid and } x \text{ Notes ale. co}$$

$$\bar{x} = \frac{M_{y}}{M} = \frac{\rho \int_{0}^{4} x \left(\sqrt{x} - \frac{1}{2} x \right) dx}{\rho \int_{0}^{4} \left(\sqrt{x} - \frac{1}{2} x \right) dx}$$

$$\overline{y} = \frac{M_x}{M} = \frac{\rho \int_0^4 \frac{1}{2} \left(\sqrt{x} + \frac{1}{2} x \right) \left(\sqrt{x} - \frac{1}{2} x \right) dx}{\rho \int_0^4 \left(\sqrt{x} - \frac{1}{2} x \right) dx}$$

b. horizontal strips

horizontal strips
$$A = \int_0^2 (2y + x^2) dy = 0$$

$$Centroid at (x, y) where$$

$$\overline{x} = \frac{M_y}{M} = \frac{\rho \int_0^2 \frac{1}{2} (2y + y^2) (2y - y^2) dy}{\rho \int_0^2 (2y - y^2) dy}$$

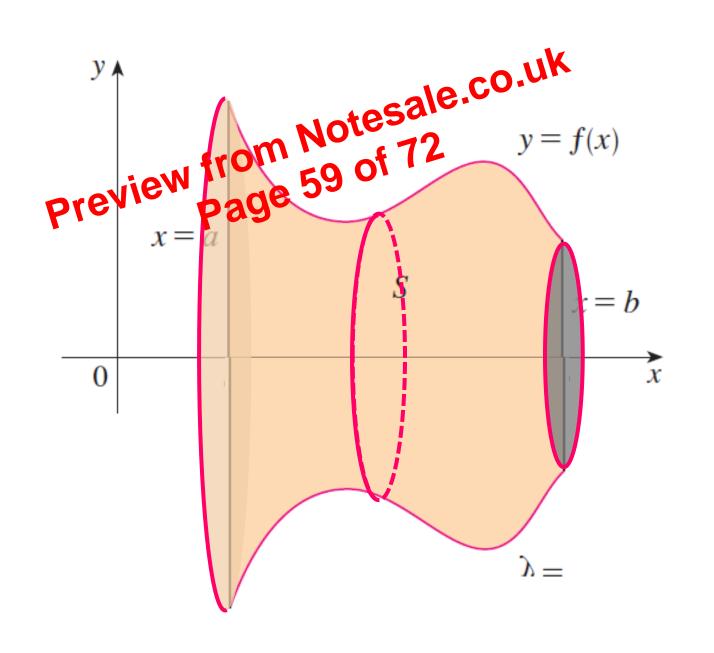
$$\overline{y} = \frac{M_x}{M} = \frac{\rho \int_0^2 y(2y - y^2) dy}{\rho \int_0^2 (2y - y^2) dy}$$

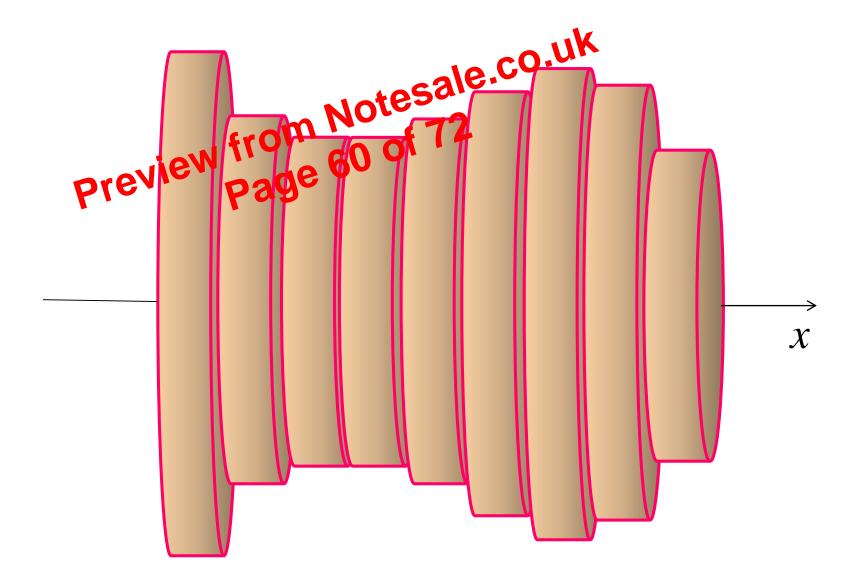
Preview from Notesale.co.uk

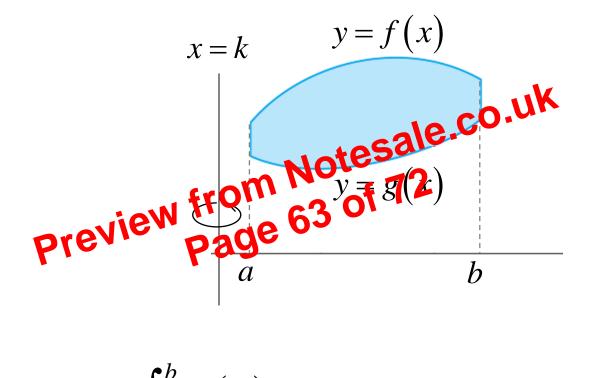
Center of Mass of a Solid of Revolution

The center of mass of the system is at $(\bar{x}, \bar{y}, \bar{z})$ where page 53 of the system is at $(\bar{x}, \bar{y}, \bar{z})$

$$\overline{x} = \frac{\sum_{i=1}^{n} m_{i} x_{i}}{\sum_{i=1}^{n} m_{i}} \qquad \overline{y} = \frac{\sum_{i=1}^{n} m_{i} y_{i}}{\sum_{i=1}^{n} m_{i}} \qquad \overline{z} = \frac{\sum_{i=1}^{n} m_{i} z_{i}}{\sum_{i=1}^{n} m_{i}}$$







Volume =
$$\int_{a}^{b} V(x) dx$$

The centroid of the solid is at $(\bar{x}, \bar{y}, \bar{z})$ where

$$\overline{x} = k \qquad \overline{y} = \frac{\rho \int_{a}^{b} \frac{1}{2} (f(x) + g(x)) V(x) dx}{\rho \int_{a}^{b} V(x) dx} \qquad \overline{z} = 0$$

Example 3.4.3.2

Set up the expressions in terms of x that give the centroid of the solid generated when the shaded regionais revolved about x = 3.

