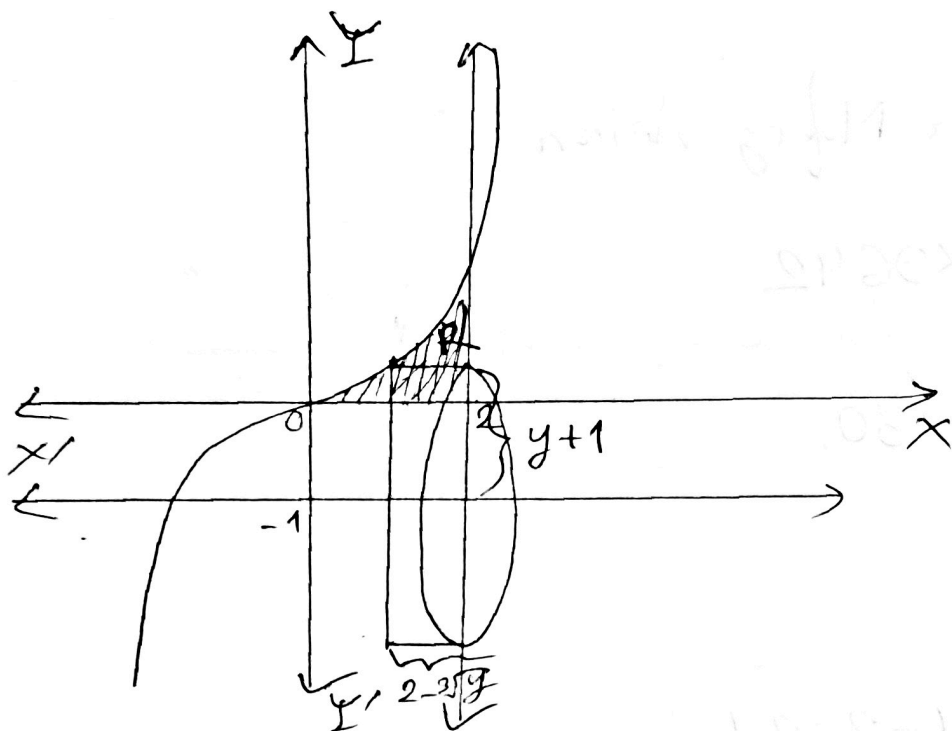# Quiz - 02

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Course : MAT130.

Section : 09

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Ans to the QNO-3

Radius, $r = y - (-1) = y + 1$

Height, $H = 2 - \sqrt[3]{y}$., Interval, $I = [0, 8]$

$\therefore$ Area of the cross section, $A = 2\pi r H$.

$$= 2\pi(y+1)(2 - \sqrt[3]{y}).$$

$\therefore$ The column of the solid, using cylindrical shells is,

$$V = \int_0^8 \left[2\pi (y+1)(2 - \sqrt[3]{y}) \right] dy$$

$$= 2\pi \int_0^8 \left[2y + 2 - y^{\frac{5}{2}} - y^{\frac{3}{2}} \right] dy$$

$$= 2\pi \left[y^2 + 2y - \frac{2}{7} y^{\frac{7}{2}} - \frac{2}{5} y^{\frac{5}{2}} \right]_0^8$$

$$= 2\pi \left[\left[(8)^2 + 2(8) - \frac{2}{7}(8)^{\frac{7}{2}} - \frac{2}{5}(8)^{\frac{5}{2}} \right] - [0] \right]$$
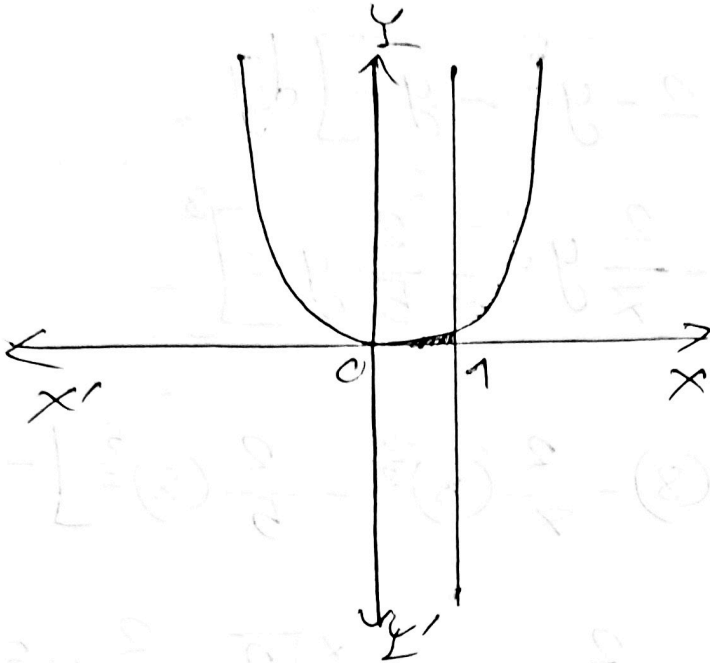
$$= 2\pi \left[64 + 16 - \frac{2}{7} \times 128 \times \sqrt[7]{2} - \frac{2}{5} \times 32 \times \sqrt[5]{2} \right]$$

$$= 2\pi \left[80 - \frac{256 \times \sqrt[7]{2}}{7} - \frac{64 \times \sqrt[5]{2}}{5} \right] \text{unit}^3$$

(Ans).

$$+ 2\pi \left[\frac{2800 - 1280 \times \sqrt[7]{2} - 448 \times \sqrt{2}}{35} \right]$$

2

Ans to the QNO:02

Solution,

$$\therefore Area = \pi r^2$$

$$= \pi (x^2)^2$$

$$= \pi x^4$$

$$\therefore Area = \int_0^1 \pi r^2$$

$$= \int_0^1 \pi (x^2)^2 = \int_0^1 \pi x^4$$

$$= \pi \left[\frac{u^5}{5} \right]_0^1$$

$$= \pi \left[\left[\frac{(1)^5}{5} \right] - [0] \right]$$

$$= \frac{1}{5} \pi \text{ unit}^2. \qquad (Ans).$$

As to the QNO : 03

$$x^2 = \sqrt{u} \qquad \text{Now,} \qquad$$

radius, $(x) =$ $\Rightarrow u^4 - u = 0 \qquad u = 0 \quad u = 1.$

$\Rightarrow u(u^3 - 1) = 0.$

Volume, $V = \int_0^1 \pi (u^4 - u) \, du.$

$$= \pi \int_0^1 (u^4 - u) \, du.$$

$$= \pi \left[\frac{u^5}{5} - \frac{u^2}{2} \right]_0^1$$

$$= \pi \left[\left[\frac{(1)^5}{5} - \frac{(1)^2}{2} \right] - [0] \right]$$

$$\textcircled{2} \quad 2\pi \left[\frac{1}{5} \right.$$

$$= \pi \left[\frac{1}{2} - \frac{1}{5} \right]$$

$$= \frac{3\pi}{10}$$

(Ans).