

Q)1

$$\int_1^4 \frac{dy}{2\sqrt{y}(1+\sqrt{y})^2}$$

let  $\sqrt{y} = x$

Then,  $dx = \frac{dy}{\sqrt{y}}$

or  $x dx = dy$

Also, at  $y = 1, x = 1$  and at  $y = 4, x = 2$

$$\text{Hence, } \int_1^4 \frac{dy}{2\sqrt{y}(1+\sqrt{y})^2} = \int_1^2 \frac{x dx}{2x(1+x)^2} = \frac{1}{2} \int_1^2 \frac{dx}{(1+x)^2}$$

$$= -\frac{1}{2} \frac{1}{(1+x)} \Big|_1^2 = \frac{-1}{2} \frac{1}{1+2} + \frac{1}{2} \frac{1}{1+1}$$

Q2)

Volume of solid revolution is given by  $\pi \int [f(x)]^2 dx$

For  $y = 0, x = 0$  in  $y = x^3$

Then, volume of revolution is  $\pi \int_0^2 (x^3)^2 dx$

$$= \pi \int_0^2 x^6 dx = \frac{x^7}{7} \Big|_0^2 = \frac{2^7}{7}$$