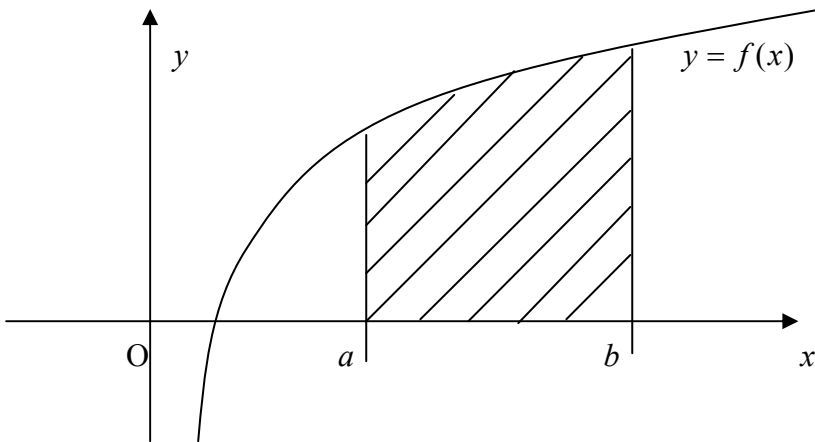


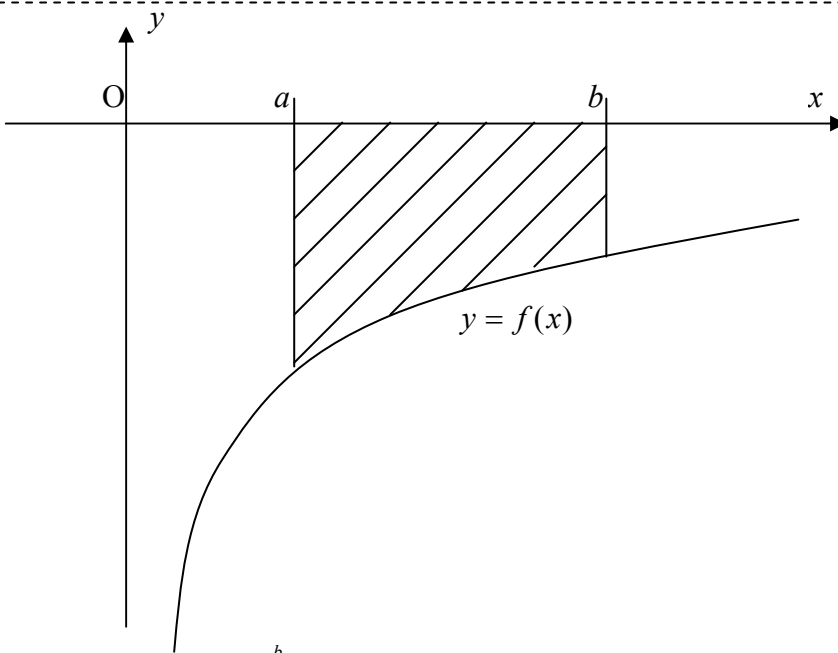
## Applications of Integration Summary

1. Area under curve:



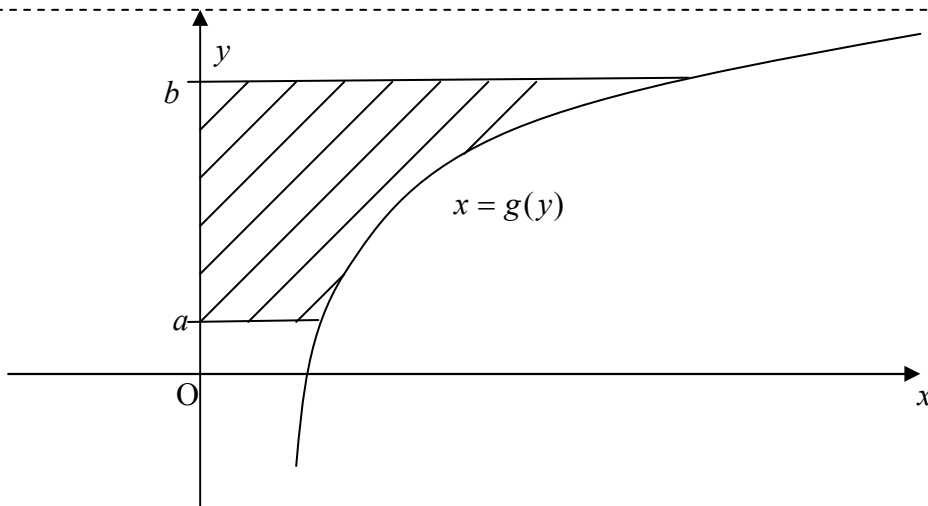
$$\text{Area of shaded region} = \int_a^b f(x) dx$$

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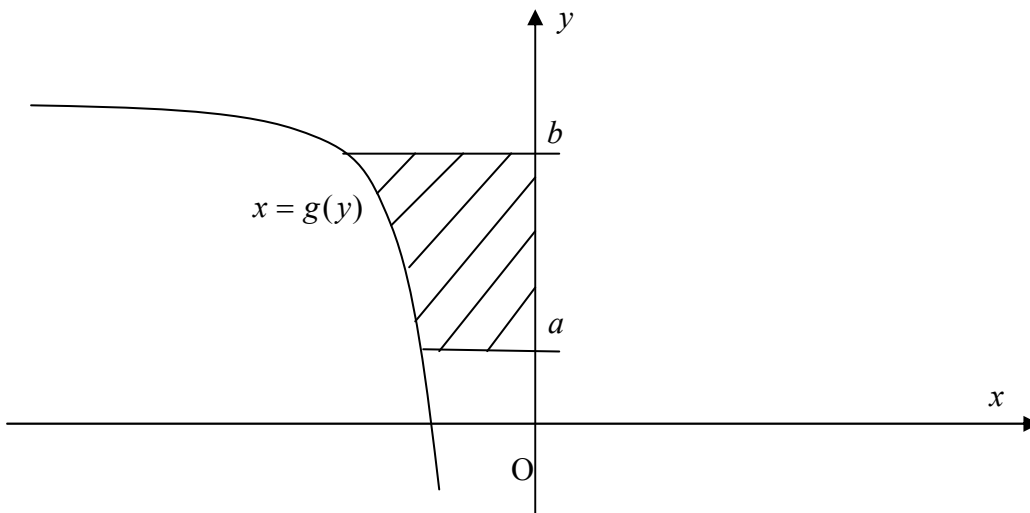


$$\text{Area of shaded region} = \left| \int_a^b f(x) dx \right|$$

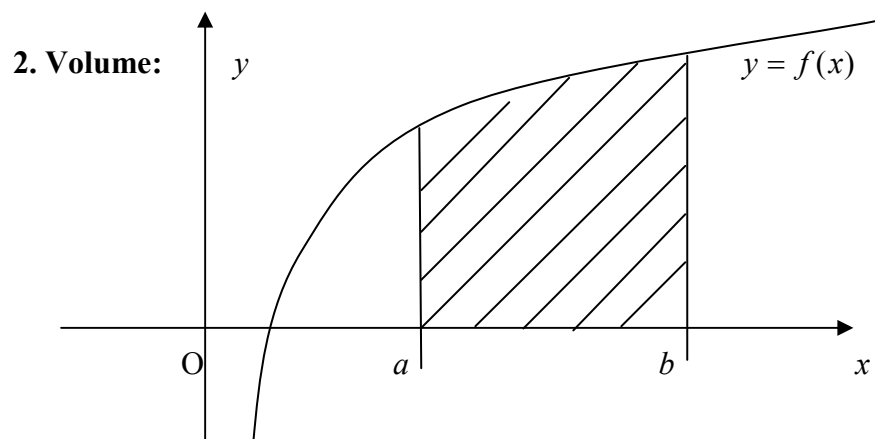
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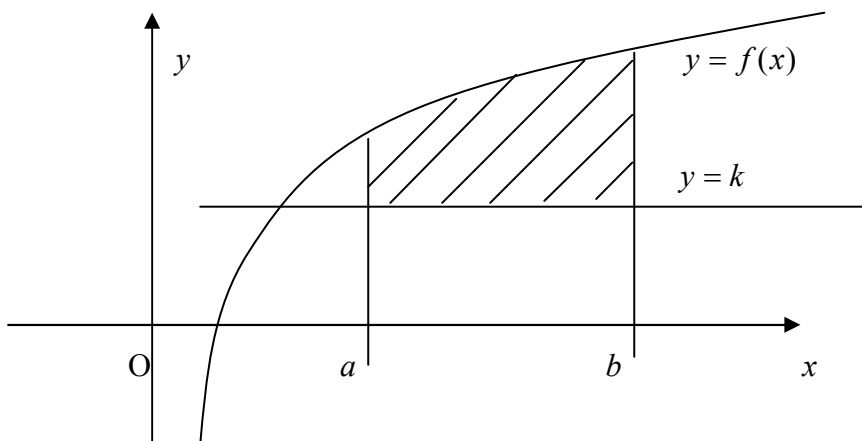
$$\text{Area of shaded region} = \int_a^b g(y) dy$$



$$\text{Area of shaded region} = \left| \int_a^b g(y) dy \right|$$



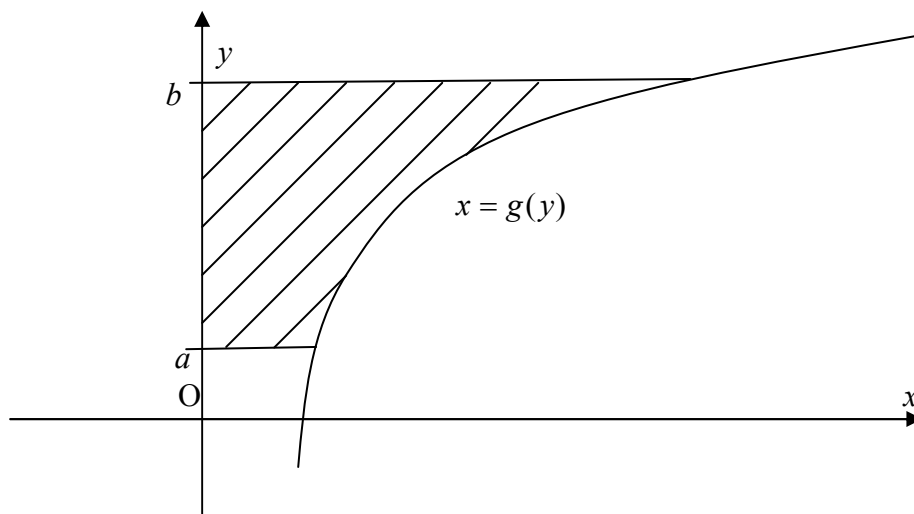
$$\text{Volume of shaded region revolved } 2\pi \text{ about the } x\text{-axis} = \pi \int_a^b [f(x)]^2 dx$$



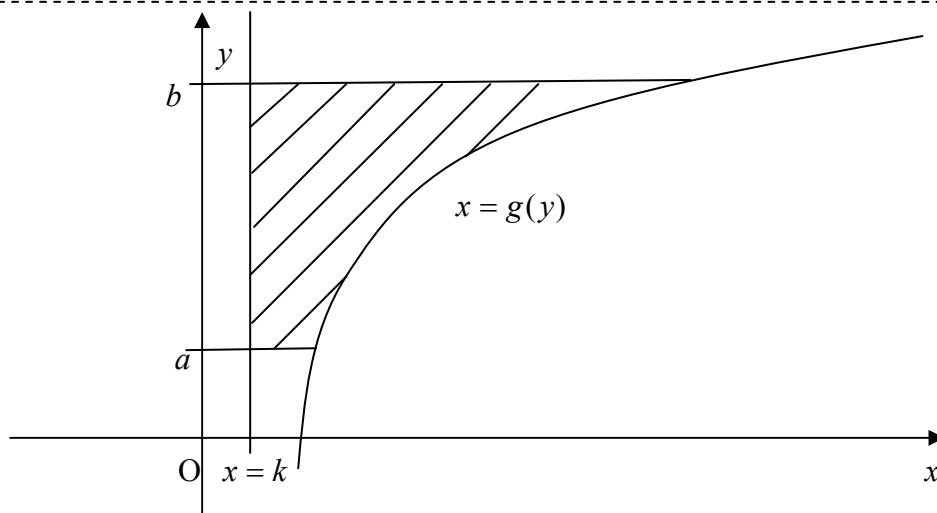
Volume of shaded region revolved  $2\pi$  about the  $y = k$  line  $= \pi \int_a^b [f(x) - k]^2 dx$

Volume of shaded region revolved  $2\pi$  about the  $x$  - axis

$$= \pi \int_a^b [f(x)]^2 dx - \pi(k^2)(b - a)$$



Volume of shaded region revolved  $2\pi$  about the  $y$  - axis  $= \pi \int_a^b [g(y)]^2 dy$



Volume of shaded region revolved  $2\pi$  about the  $x = k$  line  $= \pi \int_a^b [g(y) - k]^2 dy$

Volume of shaded region revolved  $2\pi$  about the  $y$  - axis

$$= \pi \int_a^b [g(y)]^2 dy - \pi(k^2)(b - a)$$