

Improper Integrals

The base of a solid is the region enclosed between $y = \frac{1}{2x}$ and the x -axis on the interval $1 \leq x \leq \infty$.
If every cross section of the solid perpendicular to the x -axis is a square, find the volume of the solid.

Other Improper Integrals

Other Improper Integrals – function has vertical asymptote (infinite limit at a point) within the interval of integration.

① If $f(x)$ is continuous on $(a, b]$, then

$$\int_a^b f(x) dx$$

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③ If $f(x)$ is continuous on $[a, c) \cup (c, b]$, then

$$\int_a^b f(x) dx$$

*Note: Each integral must converge in order for $\int_a^b f(x) dx$ to converge.

If either integral diverges, then $\int_a^b f(x) dx$ diverges.

Example 1:

$$\int_0^1 \frac{dx}{\sqrt{1-x^2}}$$

Example 2:

$$\int_0^4 \frac{e^{-\sqrt{x}}}{\sqrt{x}} dx$$