

☒ Class 12 Mathematics – Chapter: Applications of Integrals

1. Introduction

- Integrals help calculate areas, volumes, and other quantities that accumulate continuously.
 - Applications extend calculus concepts to real-world problems.
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2. Area Under a Curve

- Area bounded by curve $y=f(x)$, x -axis, and vertical lines $x=a$ and $x=b$:

$$\text{Area} = \int_a^b f(x) \, dx$$

3. Area Between Two Curves

- If $y=f(x)$ and $y=g(x)$ intersect at $x=a$ and $x=b$, the area between them is:

$$\text{Area} = \int_a^b |f(x) - g(x)| \, dx$$

4. Volume of Solids of Revolution

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When a curve $y=f(x)$ revolves about the x -axis, the volume generated between $x=a$ and $x=b$ is:

$$V = \pi \int_a^b [f(x)]^2 dx$$

5. Volume of Solids Revolving About the y -axis

- Volume when curve revolves about y -axis:

$$V = 2\pi \int_a^b x \cdot f(x) dx$$

6. Applications in Real Life

- Engineering: Calculating volumes and surface areas.
 - Physics: Work done by variable forces.
 - Economics: Total cost and revenue calculations.
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7. Exam Tips

- Understand the formula for area and volume.
- Practice problems involving areas bounded by curves.
- Work on volume of solids of revolution problems.

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Draw clear diagrams for visualization.