

Application of Integrals — Assignment 2

Class 12 Maths · Higher-difficulty challenge set + integrated problems · Answer key included · Narayan Gurukul Academy

Instructions: (1) Attempt all questions; start with the topic-wise challenge set, then attempt the integrated (multi-topic) problems.
(2) Give all answers with correct SI units. $g = 10 \text{ m/s}^2$ unless stated.
(3) A final answer key is provided at the end — try the full set before checking it.

Part A — Topic-wise challenge questions

Area Under a Curve

1. Find the area under $y = x^2$ from $x = 0$ to $x = 1$.
2. Find the area under $y = x$ from $x = 0$ to $x = 2$.
3. Find the area under $y = x^2$ from $x = 1$ to $x = 2$.

Area Between Two Curves

1. Find the area between $y = x$ and $y = x^2$ from $x = 0$ to $x = 1$.
2. Find the area between $y = 2x$ and $y = x^2$.
3. Find the area of the region bounded by $y = x^2$ and the line $y = x + 2$.

Standard Bounded Regions

1. Find the area of the region bounded by the circle $x^2 + y^2 = 4$ (in the first quadrant).
2. Find the area under $y = \sin x$ from 0 to π .
3. Find the area of the ellipse $x^2/16 + y^2/9 = 1$.

Choosing the Variable

1. Find the area bounded by $x = y^2$ and the y -axis from $y = 0$ to $y = 2$.
2. Find the area between $x = y^2$ and $x = y$ (integrate with respect to y).
3. Find the area of the region bounded by $x = y^2$ and $x = 4$.

Part B — Integrated problems (multi-topic)

1. Find the area under $y = x^2$ from $x = 0$ to $x = 1$.
2. Find the area between $y = x$ and $y = x^2$ from $x = 0$ to $x = 1$.
3. Find the area under $y = \sin x$ from 0 to π .
4. Find the area bounded by $x = y^2$ and $x = 4$.
5. Find the area of the ellipse $x^2/16 + y^2/9 = 1$.

Answer Key

Area Under a Curve

1/3. 2. 7/3.

Area Between Two Curves

$\frac{1}{6}$. $\frac{4}{3}$. $\frac{9}{2}$.

Standard Bounded Regions

π . 2. 12π .

Choosing the Variable

$\frac{8}{3}$. $\frac{1}{6}$. $\frac{32}{3}$.

Integrated problems

1: $\frac{1}{3}$. 2: $\frac{1}{6}$. 3: 2. 4: $\frac{32}{3}$. 5: 12π .