

UNIT TEST

Duration: 1 hour

Marks: 30

SECTION A

Each carry 1 mark

- The area enclosed by the circle $x^2 + y^2 = 2$ is equal to
(a) 4π sq. units (b) $2\sqrt{2}\pi$ sq. units (c) $4\pi^2$ sq. units (d) 2π sq. units
- The area enclosed by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is equal to
(a) $\pi^2 ab$ sq. units (b) πab sq. units (c) $\pi a^2 b$ sq. units (d) πab^2 sq. units
- The area of the region bounded by the curve $y = x^2$ and the line $y = 16$ is
(a) $\frac{37}{3}$ sq units (b) $\frac{256}{3}$ sq units (c) $\frac{64}{3}$ sq units (d) $\frac{128}{3}$ sq units
- Assertion: The area bounded by the curve $y = \cos x$ in I quadrant with coordinate axes is 1 square unit.

Reason: $\int_0^{\frac{\pi}{2}} \cos x dx = 1$.

- Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- Assertion (A) is true but Reason (R) is false.
- Assertion (A) is false but Reason (R) is true.

SECTION B

Each carry 2 marks

- Using integration, find the area of the region bounded by the line $2y = 5x + 7$, x – axis and the lines $x = 2$ and $x = 8$.
- Find the area of the region $\{(x, y): x^2 + y^2 \leq 1 \leq x + y\}$.

7. Find the area bounded by parabola $y^2 = x$ and straight line $2y = x$.

SECTION C

Each carry 3 marks

8. Sketch the graph of $y = |x + 1|$ and find the area enclosed by this curve $x = -3$, $x = 1$ and x-axis.

9. Find the area of the region enclosed by the parabola $y^2 = 4ax$ and the chord $y = mx$.

SECTION D

Each carry 5 marks

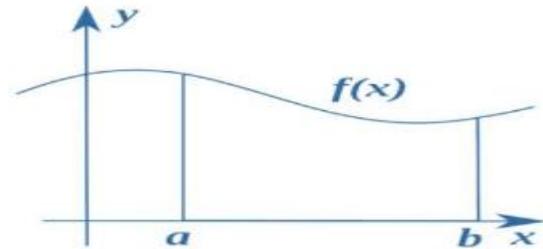
10. Find the area of the region in the first quadrant enclosed by the x-axis the line $x = \sqrt{3}y$ and the circle $x^2 + y^2 = 4$.

11. Using integration, find the area of the region bounded by the triangle whose vertices are $(-1, 1)$, $(0, 5)$ and $(3, 2)$.

SECTION E

12. Area bounded by the curve $y = f(x)$, the x-axis and between the ordinates at $x = a$ and $x = b$ is given by

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



Based on the above information, answer the following:

(i) Draw the graph of $f(x) = |x + 3|$, what does the value of the definite integral on the graph represents?

(ii) Find the value of $\int_{-6}^0 |x + 3| dx$.

UNIT TEST Answers

1. (d) 2π sq. units

2. (b) πab sq. units

3. (b) $\frac{256}{3}$ sq units

4. $\int_0^{\pi} \cos x dx = 1$

5. 96 sq.units

6. $\frac{1}{2}(\pi - 1)$ sq. units

7. $\frac{4}{3}$ sq. units

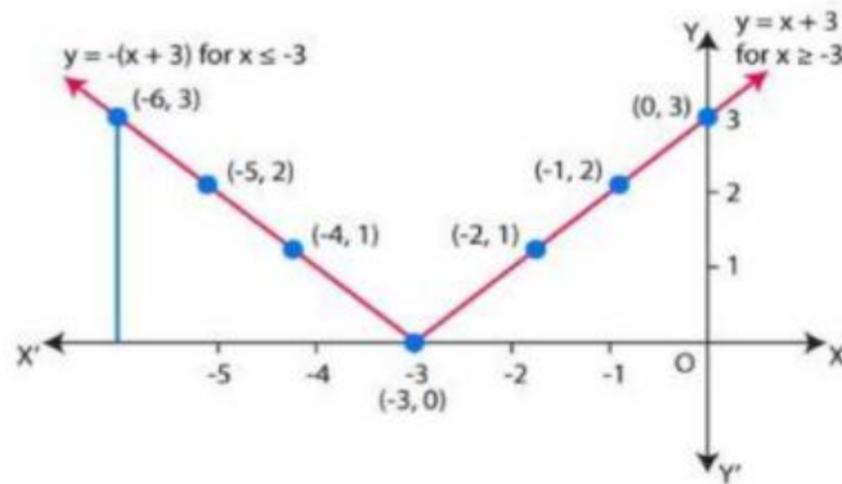
8. 4 sq.units

9. $\frac{8a^2}{3m^3}$ sq.units

10. $\frac{\pi}{3}$ sq.units

11. $\frac{15}{2}$ sq.units

12. (i)



(ii) 9