

**XII****MIND CURVE** Mid Term Maths Test Series 2026-27**Test 05**

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S no	Syllabus Covered	Chapters(In Half Yearly)	Marking Scheme
1.	Chapter 7	Integration	24
2	Chapter 8	Application of Integration	16

Note: Students/Teachers can refer to this Sample Paper for practice purpose. However, students may find or experience different exam pattern as syllabus or marking scheme may vary school to school.

MM:40

GENERAL INSTRUCTIONS

Time 1.5Hrs

READ CAREFULLY ALL INSTRUCTIONS

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 10 MCQs carrying 1 mark each
3. Section B has 3 questions carrying 02 marks each.
4. Section C has 2 questions carrying 03 marks each.
5. Section D has 2 case based integrated units of assessment (04 marks each) with sub parts of the values of 1, 1 and 2 marks each respectively.
6. Section E has 2 questions carrying 05 marks each
7. All Questions are compulsory.
8. This paper consists of 19 questions.
 - a. Write your answers neatly and legibly.
 - b. Ensure you have not left any question unanswered

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. The value of $\int_0^{\frac{\pi}{2}} \log \left(\frac{4+3 \sin x}{4+3 \cos x} \right) dx$ is :

(a) 2

(b) $\frac{3}{4}$

(c) 0

(d) -2

2. Area bounded by the curve $y = \cos x$ between $x = 0$ and $\frac{3\pi}{2}$ is

(a) 1 sq. unit

(b) 2 sq. unit

(c) 3 sq. unit

(d) 4 sq. unit

3. $\int \frac{x^9}{(4x^2+1)^6} dx$ is equal to :

(a) $\frac{1}{5x} \left(4 + \frac{1}{xx^2} \right)^{-5} + C$ (b) $\frac{1}{5} \left(4 + \frac{1}{x^2} \right)^{-5} + C$ (c) $\frac{1}{10x} \left(4 + \frac{1}{x} \right)^{-5} + C$ (d) $\frac{1}{10} \left(4 + \frac{1}{x^2} \right)^{-5} + C$

4. The area of the region bounded by the curve $x = 2y + 3$ and lines $y = 1$ and $y = -1$ is :

- (a) 4 sq. unit (b) $3/2$ sq. unit
(c) 6 sq. unit (d) 8 sq. unit

5. The value of $\int_0^{2\pi} \frac{dx}{e^{\sin x} + 1}$ is

- (a) π (b) 0 (c) 3π (d) $\pi/2$

6. Evaluate: $\int \frac{\sin^2 x - \cos^2 x}{\sin^2 x \cos^2 x} dx$

- (a) $\tan x - \cot x + C$ (b) $-\tan x + \cot x + C$
(c) $\tan x + \cot x + C$ (d) $-\tan x - \cot x + C$

7. $\int \frac{\cos 2x}{(\sin x + \cos x)^2} dx$ is equal to

- (a) $\frac{-1}{\sin x + \cos x} + C$ (b) $\log |\sin x - \cos x| + C$
(c) $\log |\sin x + \cos x| + C$ (d) $\frac{1}{(\sin x + \cos x)^2} + C$

8. $\int \frac{\sqrt{\tan x}}{\sin x \cos x} dx =$

- (a) $2\sqrt{\tan x}$ (b) $2\sqrt{\cot x}$ (c) $\sqrt{\cot x}$ (d) $\sqrt{\tan x}$

Question numbers 9 and 10 are Assertion and Reason based questions

Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

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

9. **Assertion (A):** $\int \left(x + \frac{1}{x}\right)^3 \left(1 - \frac{1}{x^2}\right) dx = \frac{1}{4} \left(x + \frac{1}{x}\right)^4 + C$

Reason (R): $\int x^n dx = \frac{x^{n+1}}{n+1} + C, n \neq -1$

10. **Assertion (A):** $\int e^x \frac{x}{(x+1)^2} dx = \frac{e^x}{x+1} + C$

Reason (R): $\int e^x \{f(x) + f'(x)\} dx = e^x f(x) + C$

SECTION – B

Questions 11 to 13 carry 2 mark each.

11(A). Solve : $\int \frac{dx}{x^2 - 8x + 15}$

Or

11(B). Evaluate: $\int \frac{dx}{9x^2 + 6x + 10}$

12. Evaluate : $\int \frac{\cos x}{\cos(x-a)} dx$

13(A). Find the area of the region bounded by the curve $y = x^2$ and $y = 16$

or

13(B). Find the area under the curve $y = x^2$ and the lines $x = -1, x = 2$ and x - axis

SECTION – C

Questions 14 to 15 carry 3 mark each

14 (A). Evaluate: $\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx$

OR

14 (B). Evaluate: $\int_1^3 |x^2 - 2x| dx$.

15. Using integration check whether given statement is true or false

Statement: The region under the curve $y = \sqrt{1 - x^2}$ on the interval $[-1, 1]$ has area $A = \pi/2$,

SECTION – D

Questions 16 to 17 carry 4 mark each.

16. Integrals of the form $\int \frac{1}{a \sin x + b \cos x + c} dx$ can be evaluated by using see following steps :

Step 1 : put $\sin x = \frac{2 \tan \frac{x}{2}}{1 + \tan^2 \frac{x}{2}}$ and $\cos x = \frac{1 - \tan^2 \frac{x}{2}}{1 + \tan^2 \frac{x}{2}}$ and simplify .

Step 2 : Replace $1 + \tan^2 \frac{x}{2}$ in the numerator by $\sec^2 \frac{x}{2}$.

Step 3 : Put $\tan \frac{x}{2} = t$ so that $\frac{1}{2} \sec^2 \frac{x}{2} dx = dt$. This substitution reduces the integral in the fare

$$\int \frac{1}{at^2 + bt + c} dt$$

Step 4 : Evaluate the integral so obtained

Based on the above information , answer the following questions :

(i) Evaluate $\int \frac{1}{1 + 2 \sin x} dx$

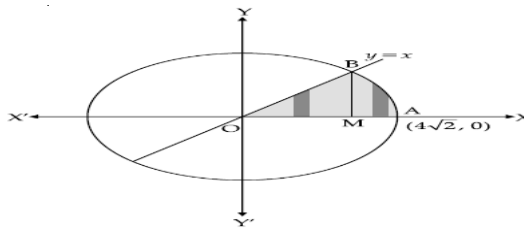
Or

Evaluate $\int \frac{1}{1 + 2 \cos x} dx$ [2]

(ii) Evaluate $\int \frac{1}{\sin x + \cos x} dx$ [2]

17. Read the following text and answer the following questions on the basis of the same:

In the figure O (0, 0) is the centre of the circle. The line $y = x$ meets the circle in the first quadrant the point B.



- (i) The equation of the circle is _____.
- (ii) The co-ordinates of B are _____.
- (iii) Find the area of the shaded region.

SECTION – E

Questions 18 to 19 carry 5 mark each.

18. find the area of ΔPQR with the vertices $P(3,1), Q(9,3)$ and $R(5,7)$ using integration

19(A). Evaluate $\int_{-1}^{\frac{3}{2}} |x \sin \pi x| dx$

Or

19(B). Evaluate $\int (\sqrt{\cot x} + \sqrt{\tan x}) dx$

End

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