



MAHARISHI VIDYA MANDIR GROUP OF SCHOOLS

UNIT TEST II

MATHEMATICS - 041 / SET II

STD: XI

DATE: 14.08.2025

ROLL.NO: _____

MAX.MARKS: 40

TIME: $1\frac{1}{2}$ HRS

General Instructions:

Read the following instructions very carefully and strictly follow them:

This Question paper contains 19 questions. All questions are compulsory.

1. This Question paper is divided into five Sections - A, B, C, D and E.
2. In Section A, Questions no. 1 to 8 are multiple choice questions (MCQs) and Questions no. 9 and 10 are Assertion - Reason based questions of 1 mark each.
3. In Section B, Questions no. 11 to 13 are Very Short Answer (VSA) - type questions, carrying 2 marks each.
4. In Section C, Questions no. 14 and 15 are Short Answer (SA) - type questions, carrying 3 marks each.
5. In Section D, Questions no. 16 and 17 are Long Answer (LA) - type questions, carrying 5 marks each.
6. In Section E, Questions no. 18 and 19 are case study - based questions carrying 4 marks each.
7. There is no overall choice. However, an internal choice has been provided in 1 question in Section B, 1 question in Section C, 1 question in Section D and one sub - part each in 1 question of Section E

Q.No	SECTION A	Marks
1.	The inclination of the straight line passing through the point $(-3, 6)$ and the midpoint of the line joining the point $(4, -5)$ and $(-2, 9)$ is a) $\frac{\pi}{3}$ b) $\frac{\pi}{4}$ c) $\frac{3\pi}{4}$ d) $\frac{\pi}{6}$	[1]
2.	The straight line $3x + y = 9$ divides the line segment joining the points $(1, 3)$ and $(2, 7)$ in the ratio a) $4 : 2$ b) $4 : 5$ c) $3 : 4$ d) $5 : 4$	[1]
3.	The solution set of the inequation $ x + 2 \leq 5$ is a) $[-7, 3]$ b) $[-5, 5]$ c) $(-7, 5)$ d) $(-7, 3)$	[1]
4.	If $-3x + 17 < -13$, then a) $x \in (\infty, -10]$ b) $x \in (-\infty, 10]$ c) $x \in (10, \infty)$ d) $x \in [10, \infty)$	[1]
5.	$\frac{\cos(90^\circ + \theta) \sec(270^\circ + \theta) \sin(180^\circ + \theta)}{\operatorname{cosec}(-\theta) \cos(270^\circ - \theta) \tan(180^\circ + \theta)}$ is equal to a) $\tan \theta$ b) $\cot \theta$ c) $\sec \theta$ d) $\cos \theta$	[1]
6.	The value of $\sin(45^\circ + \theta) - \cos(45^\circ - \theta)$ is a) 1 b) $2 \sin \theta$ c) $2 \cos \theta$ d) 0	[1]
7.	If $\cos x = \frac{1}{2}$, then $\cos 3x =$ a) $\frac{3}{2}$ b) $\frac{2}{3}$ c) $\frac{1}{6}$ d) -1	[1]
8.	$\cos 50^\circ \cos 10^\circ - \sin 50^\circ \sin 10^\circ =$ a) 1 b) $\frac{1}{\sqrt{2}}$ c) $\frac{\sqrt{3}}{2}$ d) $\frac{1}{2}$	[1]
Q 9 and Q10 are Assertion(A) and Reason(R) based questions. Mark the correct choice as:		

	(A) Both A and R are true and R is the correct explanation for A (B) Both A and R are true and R is not the correct explanation for A (C) A is True but R is False (D) A is False but R is True	
9.	Assertion (A): If θ is the obtuse angle between the lines $8x + y - 4 = 0$ and $4x + 7y - 4 = 0$, then $\tan \theta = \frac{-4}{3}$. Reason (R): angle between the two lines is given by $\tan \theta = \frac{m_1 - m_2}{1 + m_1 m_2}$	[1]
10.	Assertion (A): The value of $\sin(-690^\circ) \cos(-300^\circ) + \cos(-750^\circ) \sin(-240^\circ) = 1$. Reason (R): The values of sin and cos is negative in third and fourth quadrant respectively.	[1]

SECTION - B (2 - MARKS)

11.	Find the degree measure corresponding to 6 radians	[2]
12.	Find the inclination of the line $x + \sqrt{3}y + 6 = 0$.	[2]
13.	Solve system of linear inequations : $5x - 7 < (x + 3)$ and $\frac{-3x}{2} \geq x - 5$ (OR) Solve: $\frac{x-2}{x+5} > 2$	[2]

SECTION - C

14.	Using slopes show that the points A (-4, -1), B (-2, -4), C(4, 0) and D(2, 3) taken in order, are the vertices of a rectangle. (OR) The slope of a line is double of the slope of another line. If tangent of the angle between them is $\frac{1}{3}$, find the slopes of the lines	[3]
15.	A man wants to cut three lengths from a single piece of board of length 91 cm. The second length is to be 3 cm longer than the shortest and the third length is to be twice as long as the shortest. What are the possible lengths of the shortest board if the third piece is to be at least 5cm longer than the second?	[3]

SECTION - D

16.	Solve for x, $\frac{ x+3 +x}{x+2} > 1$	[5]
17.	Prove that: $\sin^3 x + \sin^3 \left(\frac{2\pi}{3} + x\right) + \sin^3 \left(\frac{4\pi}{3} + x\right) = -\frac{3}{4} \sin 3x$ [OR] Prove that $\cos \frac{2\pi}{15} \cdot \cos \frac{4\pi}{15} \cdot \cos \frac{8\pi}{15} \cdot \cos \frac{16\pi}{15} = \frac{1}{16}$	[5]

SECTION - E

18.	Read the following text carefully and answer the questions that follow: In science practical class, students used to perform experiments, one - day group A of class 11th have the following experiment results: A solution of 10% boric acid is to be diluted by adding a 4% boric acid solution to it. The resulting mixture is to be more than 5% but less than 8% boric acid.	
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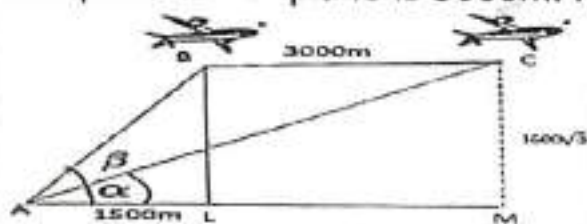
If we have 750 litres of the 10% solution, then:

1. Find the quantity of the 4% solution that has to be added . (2)P
2. In an experiment, a solution of hydrochloric acid is to be kept between 30 and 35 degrees Celsius. What is the range of temperature in degree Fahrenheit if the conversion formula is given by,

$C = \frac{5}{9} (F - 32)$ where C and F represent the temperature in degree celsius and degree Fahrenheit, respectively. (2)

19. **Read the following text carefully and answer the questions that follow:**

The angle of elevation of an aeroplane from a point A on the ground is α . After a flight of 15 seconds, the angle of elevation is β . The aeroplane is flying at a constant height of $1500\sqrt{3}$ m . Distance between two positions of plane is 3000m. Again, distance AL = 1500m.



1. Find the value of $\sin \beta$. (1)
2. Find the value of $\sin \alpha$. (1)
3. Find the value of $\cos(\beta - \alpha)$. (2)

(OR)

Find the value of $\sin(\beta - \alpha)$. (2)