



INDIAN SCHOOL AL WADI AL KABIR
REVISION PAPER (2025-26)

Class: XI
Date: 08.02.2026

Sub: MATHEMATICS

Max Marks: 80
Time: 3 hour

General Instructions:

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.
2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
6. Section E has 3 source based/case based/passage based/integrated units of assessment (4 marks each) with sub parts.

Section A

PART-1(MCQ-1 mark each)

- Q.1.** The number of proper subsets for a set with 4 elements is _____
- A** 8 **B** 16 **C** 4 **D** 15
- Q.2.** The standard deviation of 12, 10, 12, 16, 15 is:
- A** 1.449 **B** 2.449 **C** 3.449 **D** None of these
- Q.3.** What is the number of elements in the relation defined by $R = \{(x, y) : x, y \in Z \text{ and } xy = 4\}$
- A** 3 **B** 6 **C** 9 **D** 0
- Q.4.** The value of $\tan 1^\circ \cdot \tan 2^\circ \cdot \tan 3^\circ \dots \dots \tan 88^\circ \cdot \tan 89^\circ$ is:
- A** 1 **B** 0 **C** 4 **D** Not defined
- Q.5.** Degree measure of $\frac{4\pi}{3}$ is:
- A** 240° **B** 200° **C** 60° **D** 120°
- Q.6.** The solution set of the linear inequality $\frac{2x}{5} < \frac{x}{2} + 3$ is:
- A** $(30, \infty)$ **B** $(0, \infty)$ **C** $(-30, \infty)$ **D** $(-30, -\infty)$
- Q.7.** If $z = 1 + 2i$, then $|z|^2 =$
- A** $\sqrt{5}$ **B** 5 **C** $\sqrt{3}$ **D** None of these
- Q.8.** Which of the following is the solution of the inequality $4x + 3 < 5x + 7, x \in \mathbb{R}$.
- A** $(-\infty, -4)$ **B** $(-4, \infty)$ **C** $(4, \infty)$ **D** $(-\infty, 4)$

- Q.9.** If ${}^9C_4 + {}^9C_5 = {}^yC_5$, then the value of y is:
- A** 9 **B** 5 **C** 7 **D** 10
- Q.10.** The number of terms in the expansion of $(2x - 3y)^{12}$ is:
- A** 11 **B** 13 **C** 12 **D** 24
- Q.11.** If n th term of a G.P. is 3^n , then the sum of its first 6 terms is:
- A** 1092 **B** 1024 **C** 1227 **D** 1029
- Q.12.** Which term of the sequence $2, 2\sqrt{2}, 4, \dots$ is 128?
- A** 12 **B** 13 **C** 15 **D** 16
- Q.13.** The value of y will be, so that the line through $(4, y)$ and $(1, 5)$ is parallel to the line through $(2, 3)$ and $(5, 9)$ is:
- A** 12 **B** 16 **C** 13 **D** 11
- Q.14.** The vertices of a hyperbola are $(0, \pm 3)$ and its foci are $(0, \pm 5)$. Then the equation of the hyperbola is:
- A** $\frac{x^2}{6} - \frac{y^2}{16} = 1$ **B** $\frac{x^2}{9} - \frac{y^2}{16} = 1$ **C** $\frac{y^2}{9} - \frac{x^2}{16} = 1$ **D** $\frac{y^2}{6} - \frac{x^2}{16} = 1$
- Q.15.** The radius of the circle $x^2 + y^2 - 6x + 4y - 12 = 0$ is:
- A** 10 **B** 5 **C** 12 **D** 25
- Q.16.** Which of the following is a point on 7^{th} octant?
- A** $(1, 1, -2)$ **B** $(7, -2, 3)$ **C** $(-5, -2, 5)$ **D** $(-4, -3, -5)$
- Q.17.** $\lim_{x \rightarrow 0} \frac{(1+x)^4 - 1}{x} = \underline{\hspace{2cm}}$
- A** 1 **B** 2 **C** 3 **D** 4
- Q.18.** If $\lim_{x \rightarrow 2} \frac{x^n - 2^n}{x - 2} = 80$, then value of n equals:
- A** 5 **B** 6 **C** 0 **D** 7

Direction for questions 19 & 20: In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

- (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 and 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.

- Q.19. Assertion (A):** The distance between the lines $3x + 4y = 7$ and $6x + 8y = 13$ is $\frac{1}{10}$.
Reason (R): The distance between the lines $ax + by = c_1$ and $ax + by = c_2$ is given by $\frac{|c_1 - c_2|}{\sqrt{a^2 + b^2}}$.
- Q.20. Assertion:** Probability of getting a head in a toss of an unbiased coin is $\frac{1}{2}$.
Reason: In a simultaneous toss of two coins, the probability of getting 'no tails' is $\frac{1}{4}$.

Section B (2 marks each)

- Q.21.** Solve $\frac{3(x-2)}{5} \leq \frac{5(2-x)}{3}$ and represent the solution on number line.
- Q.22** a) Express $z = \left(3 + \frac{i}{3}\right)^3$ into $a + ib$ form.
OR
- b) Find the multiplicative inverse of $4 - 3i$.
- Q.23.** Expand $\left(x + \frac{1}{x}\right)^6$ using binomial expansion
- Q.24** a) Find the number of ways in which the letter of the word **PYTHON** can be arranged such that the vowels may occupy only even positions.
OR
- b) How many words can be formed from the letters of the word **FRIEND**? How many of these begin with F?
- Q.25.** Show that $(0,7, -10)$, $(1,6, -6)$ and $(4,9, -6)$ are the vertices of an isosceles triangle.

Section C (3 marks each)

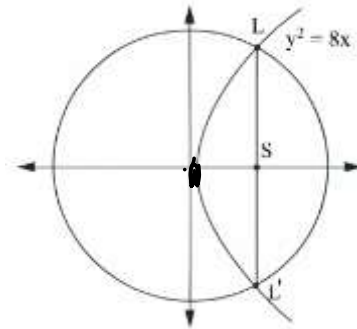
- Q.26.** Consider the sets $A = \{x: x \text{ is a letter in the word MATHEMATICS}\}$, and $B = \{y: y \text{ is a letter in the word PHYSICS}\}$. Then find
- (i) $A \cup B$ (ii) $A \cap B$ (iii) $A - B$.
- Q.27** a) i. If $z = \frac{1+i}{1-i}$ is a complex number, find the real part of z
 ii. Verify that $|z| = |\bar{z}|$. OR
- b) If $z = \frac{(2+3i)^2}{1-i} + \frac{4-i}{1+i}$, express z in the form $a + bi$, where $a, b \in \mathbb{R}$.
- Q.28** a) By using binomial theorem show that: $6^n - 5n - 1$ is divisible by 25, $n \in \mathbb{N}$
OR
- b) Simplify $(a + b)^4 - (a - b)^4$ and evaluate $(\sqrt{3} + \sqrt{2})^4 - (\sqrt{3} - \sqrt{2})^4$.
- Q.29** 4 cards are drawn from a deck of 52 cards. find the number of ways of choosing
- (i) 3 red and 1 black cards (ii) exactly three ace cards.

Q.30 Find the domain and range of the function a) $f(x) = 2 - |x|$ b) $\sqrt{x^2 - 9}$

Q.31 a. Find the equation of the ellipse whose length of the major axis is 26 and foci are $(\pm 5, 0)$.

OR

b. The latus rectum LL' of the parabola is a chord to the circle centered at origin as shown in the figure. Write the equation of the circle.



Section D (5 Marks Each)

Q.32. Calculate Mean, Variance and Standard Deviation for the following data:

Class	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100
Frequ ency	3	7	12	15	8	3	2

Q.33. a) If $\tan x = \frac{3}{4}, \pi < x < \frac{3\pi}{2}$, then find the value of $\sin \frac{x}{2}, \cos 2x$ and $\sin 2x$

OR

b) Prove the following

(i) $\cot^2 \frac{\pi}{6} + \operatorname{cosec} \frac{5\pi}{6} + 3\tan^2 \frac{\pi}{6} = 6.$

(ii) $\frac{\cos 2x + \cos 3x + \cos 4x}{\sin 2x + \sin 3x + \sin 4x} = \cot 3x$

Q.34. The ratio of A.M. and G.M. of two positive no. a and b is m: n. Show that

$$a : b = (m + \sqrt{m^2 - n^2}) : (m - \sqrt{m^2 - n^2})$$

Q.35. a) i) Find the derivative of $\tan x$ using first principle.

ii) Find $\frac{dy}{dx}$, if $y = \sin x \cos x$.

OR

b) i) Find the derivative of $\cos x$ using first principle.

ii) Find the derivative of $\frac{\sin x + \cos x}{\sin x - \cos x}$

SECTION E

(CASE STUDY QUESTIONS 4 MARKS EACH)

Q.36 A company is analyzing the buying behavior of customers for two products, A and B. They want to understand the likelihood of a customer buying either product, both products, or neither. Using probability helps the company make decisions on inventory, discounts, and marketing campaigns. Product A is a smartphone, Product B is a tablet. The probability that a customer buy A is 0.42,

The probability that a customer buy B is 0.48, The probability that a customer buy both A and B is 0.16

Based on the above information, answer the following questions.

- i) The probability that a customer does not buy A (1m)
- ii) The probability that a customer does not buy B. (1m)
- iii) The probability that a customer buys at least one product. (2 m)

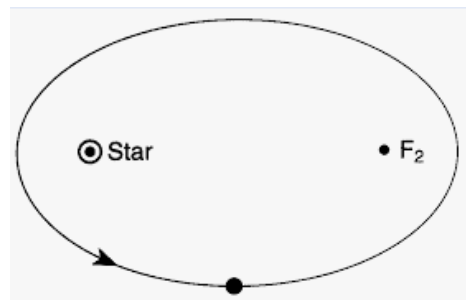


Q.37. In urban planning and civil engineering, roads and streets are often designed to be perpendicular to each other for ease of traffic flow and safety. Understanding slopes and equations of lines helps engineers model roads, intersections, and plots of land mathematically before construction. This case study considers a straight road and explores how to design a perpendicular road through a given point. A city has a main road represented by the line $L_1: x - 3y + 4 = 0$

Help the city engineers to:

- (i) Find the slope of the perpendicular road to this main road. (1m)
- (ii) Find the equation of a perpendicular road to this main road and passes through a key landmark at point P (1,2). (2m)
- (iii) Find the exact intersection point of the main road and the new perpendicular road to plan a traffic junction. (1m)

Q.38. A planet revolves around a distant star in an elliptical orbit, with the star located at one of the foci of the ellipse. The planet's closest distance to the star is 50000 km, and its farthest distance is 150000 km.



Based on this information, answer the following:

- (i) Find the distance of the star from the center of the elliptical orbit. (2 m)
- (ii) Write the equation of the elliptical orbit if the center is at the origin and the major axis lies along the x-axis. (2 m)

ANSWERS

Q1	D)15	Q2	B) 2.449	Q3	B)6	Q4	A)1
Q5	A)240°	Q6	C) $(-30, \infty)$	Q7	B)5	Q8	B) $(-4, \infty)$
Q9	D)10	Q10	B)13	Q11	A) 1092	Q12	B)13
Q13	D)11	Q14	C) $\frac{y^2}{9} - \frac{x^2}{16} = 1$	Q15	B)5	Q16	D) $(-4, -3, -5)$
Q17	D)4	Q18	A)5	Q19	A	Q20	B
Q21	$9(x - 2) \leq 25(2 - x)$ $9x - 18 \leq 50 - 25x$ $34x \leq 68 \Rightarrow x \leq 2$						
Q22	(a) $z = \frac{2}{3} + \frac{26}{27}i$ (b) $\frac{4}{25} + \frac{3}{25}i$						
Q23	$\left(x + \frac{1}{x}\right)^6 = \sum_{k=0}^6 \binom{6}{k} x^{6-k} \left(\frac{1}{x}\right)^k$ $= \sum_{k=0}^6 \binom{6}{k} x^{6-k-k} = \sum_{k=0}^6 \binom{6}{k} x^{6-2k}$ $= x^6 + 6x^4 + 15x^2 + 20 + \frac{15}{x^2} + \frac{6}{x^4} + \frac{1}{x^6}$						
Q24	(a) PYTHON (vowels in even positions): 144 (b) FRIEND (total words): 720, beginning with F: 120						
Q25	$AB = \sqrt{(1-0)^2 + (6-7)^2 + (-6+10)^2} = \sqrt{1+1+16} = \sqrt{18}$ $AC = \sqrt{(4-0)^2 + (9-7)^2 + (-6+10)^2} = \sqrt{16+4+16} = \sqrt{36} = 6$ $BC = \sqrt{(4-1)^2 + (9-6)^2 + (-6+6)^2} = \sqrt{9+9+0} = \sqrt{18}$ <p>AB=BC</p>						
Q26	(a) $A \cup B = \{A, C, E, H, I, M, P, S, T, Y\}$ (b) $A \cap B = \{C, H, I, S\}$ (c) $A - B = \{A, E, M, T\}$						
Q27	a) i) $z = \frac{1+i}{1-i} \cdot \frac{1+i}{1+i} = \frac{(1+i)^2}{(1-i)(1+i)}$ <p>Real part of z: 0</p> ii) Verified: $ z = \bar{z} = 1$ b) $(2+3i)^2 = 4 + 12i + 9i^2 = -5 + 12i$ $\frac{-5+12i}{1-i} \cdot \frac{1+i}{1+i} = \frac{(-5+12i)(1+i)}{1+1}$						

	$(-5 + 12i) + (-5i + 12i^2) = -5 + 12i - 5i - 12 = (-17) + 7i$ $\frac{-17 + 7i}{2} = -\frac{17}{2} + \frac{7}{2}i$ $\frac{4 - i}{1 + i} \cdot \frac{1 - i}{1 - i} = \frac{(4 - i)(1 - i)}{2} = \frac{4 - 4i - i + i^2}{2} = \frac{3 - 5i}{2} = \frac{3}{2} - \frac{5}{2}i$																								
Q28	<p>a) $6^n - 5n - 1 = (5 + 1)^n - 5n - 1$ $= 1 + 5n + \binom{n}{2}5^2 + \dots + 5^n - 5n - 1$ $= 5^2[\binom{n}{2} + 5\binom{n}{3} + \dots + 5^{n-2}\binom{n}{n}]$</p> <p>b) $(a + b)^4 - (a - b)^4 = 8ab(a^2 + b^2)$ $8ab(a^2 + b^2) = 8(\sqrt{3} \cdot \sqrt{2})((\sqrt{3})^2 + (\sqrt{2})^2)$ $= 8(\sqrt{6})(3 + 2) = 8 \cdot \sqrt{6} \cdot 5 = 40\sqrt{6}$</p>																								
Q29	<p>(a) 3 red and 1 black: 67,600 ways</p> <p>(b) Exactly 3 aces: 192 ways</p>																								
Q30	<p>a) Domain: \mathbb{R} or $(-\infty, \infty)$ Range: $(-\infty, 2]$</p> <p>b) $\mathbb{R} - (-3, 3)$ to $[0, \infty)$</p>																								
Q31	<p>a) $a = 13$ and $c = 5$ $5^2 = 13^2 - b^2$ $25 = 169 - b^2$ $b^2 = 169 - 25 = 144$ $b = \sqrt{144} = 12$</p> $\frac{x^2}{13^2} + \frac{y^2}{12^2} = 1$ $\frac{x^2}{169} + \frac{y^2}{144} = 1$ <p>b) $4a=8$, $a=2$ Coordinate of L is $(2, y)$ Since length of latus rectum is 8, $y=4$ Radius²=20 Required equation is $x^2 + y^2 = 20$</p>																								
Q32	<table border="1"> <thead> <tr> <th>x</th> <th>f</th> <th>d = x - A</th> <th>d²</th> <th>fd</th> <th>fd²</th> </tr> </thead> <tbody> <tr> <td>35</td> <td>3</td> <td>-30</td> <td>900</td> <td>-90</td> <td>2700</td> </tr> <tr> <td>45</td> <td>7</td> <td>-20</td> <td>400</td> <td>-140</td> <td>2800</td> </tr> <tr> <td>55</td> <td>12</td> <td>-10</td> <td>100</td> <td>-120</td> <td>1200</td> </tr> </tbody> </table>	x	f	d = x - A	d ²	fd	fd ²	35	3	-30	900	-90	2700	45	7	-20	400	-140	2800	55	12	-10	100	-120	1200
x	f	d = x - A	d ²	fd	fd ²																				
35	3	-30	900	-90	2700																				
45	7	-20	400	-140	2800																				
55	12	-10	100	-120	1200																				

65	15	0	0	0	0
75	8	10	100	80	800
85	3	20	400	60	1200
95	2	30	900	60	1800
Σ	50			-150	10500

$$\bar{x} = A + \frac{\sum fd}{\sum f}$$

$$\bar{x} = 65 + \frac{-150}{50} = \boxed{62}$$

Mean = 62

Variance = 201

Standard Deviation \approx 14.18

Q33

a) $\sin \frac{x}{2} = \frac{3}{\sqrt{10}}, \cos 2x = \frac{7}{25}, \sin 2x = \frac{24}{25}$

b)

$$\frac{\cos 2x + \cos 3x + \cos 4x}{\sin 2x + \sin 3x + \sin 4x} = \frac{\cos 3x(2\cos x + 1)}{\sin 3x(2\cos x + 1)} = \frac{\cos 3x}{\sin 3x} = \cot 3x$$

Q34

(i) A.M. = $\frac{a+b}{2}$, G.M. = \sqrt{ab}

$$\frac{\frac{a+b}{2}}{\sqrt{ab}} = \frac{m}{n} \Rightarrow \frac{a+b}{2\sqrt{ab}} = \frac{m}{n}$$

$$\frac{a+b}{\sqrt{ab}} = \frac{2m}{n}$$

$$\sqrt{\frac{a}{b}} = \frac{m \pm \sqrt{m^2 - n^2}}{n} \Rightarrow \frac{a}{b} = \left(\frac{m + \sqrt{m^2 - n^2}}{n} \right)^2$$

(ii) $S_n = T_1 + T_2 + \dots + T_n = \frac{8}{9} \sum_{k=1}^n (10^k - 1)$

$$\sum_{k=1}^n (10^k - 1) = \sum_{k=1}^n 10^k - \sum_{k=1}^n 1 = \frac{10(10^n - 1)}{9} - n$$

$$S_n = \frac{8}{9} \left(\frac{10(10^n - 1)}{9} - n \right) = \frac{8}{81} (10^{n+1} - 10 - 9n)$$

Q35	$\tan(x+h) = \frac{\tan x + \tan h}{1 - \tan x \tan h}$ <p>i) $\frac{\tan(x+h) - \tan x}{h} = \frac{\frac{\tan x + \tan h}{1 - \tan x \tan h} - \tan x}{h} = \frac{\tan h(1 + \tan^2 x)}{h(1 - \tan x \tan h)}$</p> $\lim_{h \rightarrow 0} (1 - \tan x \tan h) = 1$ $\frac{d}{dx} (\tan x) = 1 + \tan^2 x = \sec^2 x$ $y = \sin x \cdot \cos x$ <p>ii) $\frac{dy}{dx} = (\cos x)(\cos x) + (\sin x)(-\sin x) = \cos^2 x - \sin^2 x = \cos 2x$</p> <p>b)</p> <p>i) $f'(x) = \lim_{h \rightarrow 0} \frac{\cos(x+h) - \cos x}{h} = \lim_{h \rightarrow 0} \frac{\cos x \cos h - \sin x \sin h - \cos x}{h}$ $= \lim_{h \rightarrow 0} \frac{\cos x(\cos h - 1) - \sin x \sin h}{h} = -\sin x$</p> <p>ii) $\frac{dy}{dx} = \frac{(\sin x - \cos x)(\cos x - \sin x) - (\sin x + \cos x)(\cos x + \sin x)}{(\sin x - \cos x)^2} = \frac{-2}{(\sin x - \cos x)^2}$</p>
Q36	<p>i) P(not A)=0.58 ii) P(not B)=0.52 iii) P(A or B)=0.74</p>
Q37	<p>(i) Slope of perpendicular line: -3 (ii) Equation of perpendicular line through (1,2): $y = -3x + 5$</p> <p>(iii) Intersection point with given line: (11/10, 17/10)</p>
Q38	<p>(i) Closest distance=$a-c=50,000$ km farthest distance=$a+c=150,000$ km on solving we get, $a=100,000$ km and $c=50,000$</p> $b^2 = a^2 - c^2$ $b^2 = (100,000)^2 - (50,000)^2$ $b^2 = 10^{10} - 2.5 \times 10^9$ $b^2 = 7.5 \times 10^9$ $b^2 = 75 \times 10^8 \text{ or } 75 \times 10^8 \text{ km}^2$ <p>(ii) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ $\frac{x^2}{(100,000)^2} + \frac{y^2}{7.5 \times 10^9} = 1$ $\frac{x^2}{10^{10}} + \frac{y^2}{7.5 \times 10^9} = 1$</p>
