INDIAN SCHOOL AL WADI AL KABIR

Mid-term Examination (2025-26)

Sub: MATHEMATICS (041)

Date: 16-09-2025 **Set -1** Maximum marks: 80

Class: X Time: 3 hours

General Instructions:

Read the following instructions very carefully and strictly follow them:

(i) This question Paper contains 38 questions. All questions are compulsory.

(ii) This question paper is divided into five Sections A, B, C, D and E.

(iii) In Section A, Questions no. 1 to 18 are multiple choice questions (MCQs) and questions number 19 and 20 are Assertion-Reason based questions of 1 mark each.

(iv) In Section B, Questions no. 21 to 25 are very short answer (VSA) type questions, carrying 2 marks each.

(v) In Section C, Questions no. 26 to 31 are short answer (SA) type questions, carrying 3 marks each.

(vi) In Section D, Questions no. 32 to 35 are long answer (LA) type questions carrying 5 marks each.

(vii) In Section E, Questions no. 36 to 38 are case study-based questions carrying 4 marks each. Internal choice is provided in 2 marks questions in each case-study.

(viii) There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 3 questions in Section E.

(ix) Draw neat diagrams wherever required.

(x) Use of calculators is not allowed.

SECTION A

This section comprises multiple choice questions (MCQs) of 1 mark each.

Q.1. The ratio of HCF to LCM of the least composite number and the least prime number is:

(A) 1:1 (B) 1:2 (C) 2:1 (D) 1:3

Q.2. If one zero of the polynomial $x^2 - 3kx + 4k$ be twice the other, then the value of k is:

(A) 2 (B) -2 (C) $\frac{1}{2}$ (D) $-\frac{1}{2}$

Q.3. The pair of equations $ax + 2y = 9$ and $3x + by = 18$ represent parallel lines, where a,b are integers, if:

(A) $a = b$ (B) $3a = 2b$ (C) $2a = 3b$ (D) $ab = 6$

Q.4. A quadratic equation whose roots are $\left(2 + \sqrt{3}\right)$ and $\left(2 - \sqrt{3}\right)$ is:

(A) $x^2 - 4x + 1 = 0$ (B) $x^2 + 4x + 1 = 0$ (C) $4x^2 - 3 = 0$ (D) $x^2 - 1 = 0$

Q.5. In ΔABC and ΔDEF, $\frac{AB}{FD} = \frac{BC}{DE}$. Which of the following makes the two triangles similar?

(A) $\angle A = \angle D$ (B) $\angle B = \angle E$ (C) $\angle B = \angle D$ (D) $\angle A = \angle E$

Q.6. If $\tan\theta = \frac{5}{12}$, then the value of $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta}$ is :

(A) $\frac{-17}{7}$ (B) $\frac{17}{7}$ (C) $\frac{17}{13}$ (D) $\frac{-7}{13}$

Q.7. The distance between the points $\left(0, 2\sqrt{5}\right)$ *and* $\left(-2\sqrt{5}, 0\right)$ is:

(A) $0\ units$ (B) $4\sqrt{10}\ units$ (C) $2\sqrt{20}\ units$ (D) $2\sqrt{10}\ units$

Q.8. The distribution below gives the marks obtained by 80 students on a test:

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60
Number of students	3	12	27	57	75	80

The modal class of this distribution is:

(A) 10-20 (B) 20-30 (C) 30-40 (D) 50-60

Q.9. In a group of 20 people, 5 can't swim. If one peron is selected at random, then the probability that he/she can swim, is

(A) $\frac{1}{3}$ (B) $\frac{3}{4}$ (C) 1 (D) $\frac{1}{4}$

Q.10. If $p^2 = \frac{48}{75}$, then p is a/an:

(A) whole number (B) integer (C) rational number (D) irrational number

Q.11. If α, β are zeroes of the polynomial $x^2 - 1$, then value of $(\alpha + \beta)$ is:

(A) 2 (B) 1 (C) -1 (D) 0

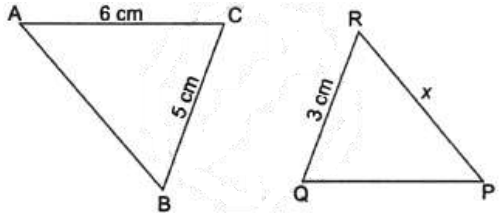
Q.12. The point of intersection of the line represented by $3x - y = 3$ and y-axis is given by:

(A) $(0, -3)$ (B) $(0, 3)$ (C) $(2, 0)$ (D) $(-2, 0)$

Q.13. If $x = 0.3$, is a root of the equation $x^2 - 0.9k = 0$, then k is equal to:

(A) 1 (B) 10 (C) 0.1 (D) 100

Q.14. In the figure, $\Delta ABC \sim \Delta QPR$. If AC = 6 cm, BC = 5 cm, QR = 3cm and PR = x, then the value of x is:



(A) 3.6 cm (B) 2.5 cm (C) 10 cm (D) 3.2 cm

Q.15. If a pole 6 m high casts a shadow $2\sqrt{3}\ m$ long on the ground, then sun's elevation is:

(A) 45° (B) 30° (C) 90° (D) 60°

Q.16. If end points of a diameter of a circle are (-5,4) and (1,0) then the radius of the circle is:

(A) $2\sqrt{13}\ units$ (B) $\sqrt{13}\ units$ (C) $4\sqrt{2}\ units$ (D) $2\sqrt{2}\ units$

Q.17. If the mean and the median of a data are 12k and 15k respectively, then its mode is:

(A) 21k (B) 13.5k (C) 6k (D) 14k

Q.18. The prime factorisation of natural number 288 is

(A) $2^4 \times 3^3$ (B) $2^4 \times 3^2$ (C) $2^5 \times 3^2$ (D) $2^5 \times 3^1$

Questions number 19 and 20 are Assertion and Reason based questions carrying 1 mark each. 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 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 quadratic equation $p(x) = x^2 + 3x + 3 = 0$ has two real roots.
Reason (R): A quadratic equation can have at most two real roots.

Q.20. Assertion (A): The probability that a leap year has 53 Sundays is $\frac{2}{7}$.
Reason (R): The probability that a non-leap year has 53 Sundays is $\frac{5}{7}$.

SECTION B

This section comprises very short answer (VSA) type questions of 2 marks each

Q.21. (a) Show that $5 - 2\sqrt{3}$ is an irrational number if $\sqrt{3}$ is irrational.

OR

(b) Find the greatest number which divides 85 and 72 leaving remainders 1 and 2 respectively.

Q.22. Find out whether the following pair of linear equations are consistent or inconsistent:
$5x - 3y = 11,\ -10x + 6y = 22.$

Q.23. Find the value of m for which the quadratic equation $(m-1)x^2 + 2(m-1)x + 1 = 0$ has two real and equal roots.

Q.24. If A and B are acute angles such that $sin(A - B) = 0$ and $2\cos(A + B) - 1 = 0$, then find angles A and B.

Q.25. (a) Show that the points (– 2, 3), (8, 3) and (6, 7) are the vertices of a right-angled triangle.

OR

(b) The line segment joining the points A(4, – 5) and B(4,5) is divided by the point P such that AP : AB = 2 : 5. Find the coordinates of P.

SECTION C

This section comprises of short answer (SA) type questions of 3 marks each.

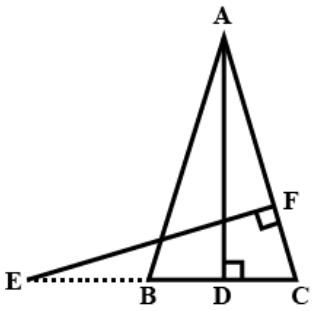
Q.26. If α and β are the zeroes of the polynomial $3x^2 + 5x + k$ such that $\alpha^2 + \beta^2 + \alpha\beta = \frac{19}{9}$, then find the value of k.

Q.27. (a) A number consists of two digits whose sum is 10. If 18 is subtracted from the number, its digits are reversed. Find the number.

OR

(b)Jaya scored 40 marks in a test getting 3 marks for each correct answer and losing 1 mark for each incorrect answer. Had 4 marks being awarded for each correct answer and 2 marks were deducted for each incorrect answer then Jaya again would have scored 40 marks. How many questions were there in the test?

Q.28. In the given figure, E is a point on the side CB produced of an isosceles triangle ABC with AB = AC. If AD ⊥ BC and EF ⊥ AC, then prove that $\Delta ABD \sim \Delta ECF$.



Q.29. If $\mathbf{4\,cot^2\,45° - sec^2\,60° + \,sin^2\,60° + p = \frac{3}{4}}$ then find the value of $\boldsymbol{p}$.

Q.30. Find the unknown entries p, q, r, s, t and u in the following distribution.

Height (in cm)	Frequency	Cumulative frequency
105-110	p	21
110-115	13	q
115-120	r	50
120-125	11	s
125-130	t	66
130-135	u	77
Total	77	

Q.31. (a) Find zeroes of the polynomial $3x^2 - 10x - 8$ and verify the relationship between zeroes and its coefficients.

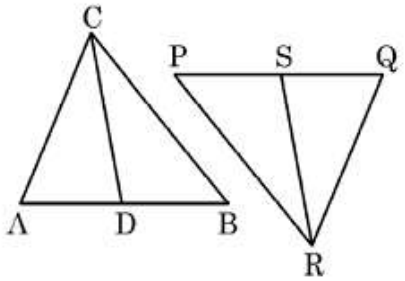
-OR-

(b) If one zero of the polynomial $ax^2 + bx + c$ is double of the other, then show that $2b^2 = 9ac$.

SECTION D

This section comprises long answer (LA) type questions of 5 marks each.

Q.32. (a) In the given figure, CD and RS are respectively the medians of Δ ABC and Δ PQR.
If Δ ABC ~ Δ PQR then prove that:
(i) Δ ADC ~ Δ PSR
(ii) $AD \times PR = AC \times PS$



OR

(b)Through the mid-point M of the side CD of a parallelogram ABCD, the line BM is drawn intrsecting AC in L and AD (produced) in E. Prove that EL = 2BL.

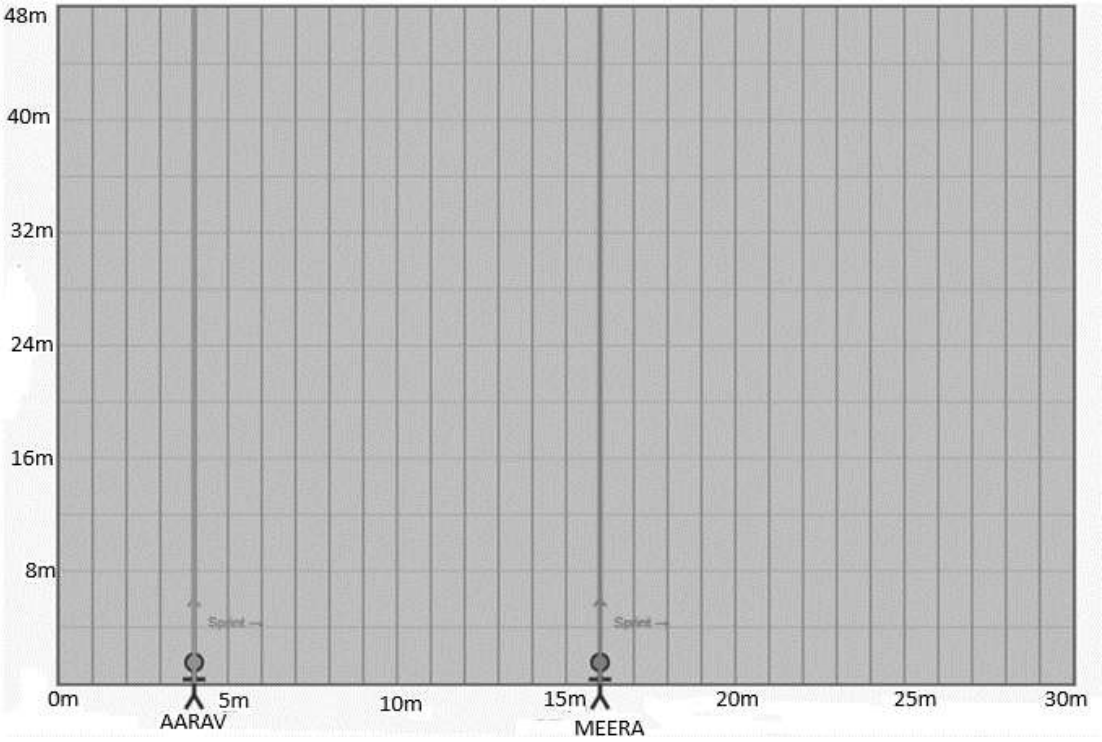
Q.33. Determine graphically the coordinates of the vertices of a triangle, the equations of whose sides are given by 2y – x = 8 and y – 2x = 1 with x-axis.

Q.34. To conduct Sports Day activities, in a rectangular shaped school ground ABCD with length AD = 48 m and width AB = 30 m. Vertical chalk lines (parallel to AD) are drawn at every 1 m across the width, so the "1st line" is along AD, the "2nd line" is 1 m to the right of AD, and so on up to the 31st line along BC. Along AD, meter marks are made at every 1 m from A (0 m) down to D (48 m). Aarav sprints along the 5th vertical line and places a blue cone at one-third of the distance from A to D. Meera sprints along the 17th vertical line and places a yellow cone at two-thirds of the distance from A to D.

(i). Find the coordinates of ABCD.

(ii). What is the straight-line distance between the two cones?

(iii). Riya must place a hydration stand exactly halfway along the line segment joining the two cones. On which vertical line and at what distance from A should she place it?



Q.35. (a) The weights (in kg) of 50 wild animals of a national park were recorded and the following data was obtained:

Weight (in kg)	Number of animals
100-110	4
110-120	12
120-130	23
130-140	8
140-150	3

Find the mean weight (in kg) of animals. Also find the mode of the data.

(OR)

(b)If the median of the following data is 33 then, find the value of m and hence find the mode:

Class	0-15	15-30	30-45	45-60	60-75	75-90
Frequency	17	35	40	18	m	2

SECTION E (Case Study Based Questions -4 Marks each)

Q.36. A book seller has 420 Science stream books and 130 Arts stream books. He wants to stack them in such a way that each stack has the same number and they take up the least area of the surface. Based on the above information, answer the following:

(i) Find the prime factorization of 420 and 130. 1m

(ii) What is the maximum number of books that can be placed in each stack if there are 420 Science stream books and 130 Arts stream books? 1m

(iii) (a) The book seller later found that he has not placed 540 fiction books. If the book seller stacks them in the similar way, then find the maximum number of books that can be placed in each stack and the total number of stacks including the 540 fiction books? 2m

-OR-

(b) With reference to question (ii), if the book seller doubles the quantity, then find the maximum number of books that can be placed in each stack and the total number of stacks. 2m

Q.37. In the given picture, one can see a rectangular in-ground swimming pool installed by a family in their backyard. There is a concrete sidewalk around the pool of width "$x\ meter$". The outside edges of the sidewalk measure 7 m and 12 m. The area of the pool is 36 sq.m.
Based on the above information, answer the following:

(i) Find the dimensions of the pool excluding the sidewalks in terms of "x". 1m

(ii) Form a quadratic equation of the pool excluding the sidewalks in terms of "x". 1m

iii) (a) What is the width of the sidewalk around the pool? 2m

-OR- 2m

(b)What will be the possible values of x if the dimensions of the swimming pool are $(18-2x)$ and $(12-2x)$ and they satisfy an equation $(18-2x)(12-2x)=72$.

Q.38. Blood group describes the type of blood a person has. It is a classification of blood based on the presence of inherited antigenic substances on the surface of red blood cells. Blood types predict whether a serious reaction will occur in a blood transfusion. In a sample of 50 people, 21 had type O blood, 22 had type A, 5 had type B and rest had type AB blood group. Based on the above information, answer the following questions.

(i) What is the probability that a person chosen at random had type O blood? 1m

(ii) What is the probability that a person chosen at random had type AB blood group? 1m

(iii) (a)What is the probability that a person chosen at random had neither type A nor type B blood group? 2m

-OR-

(b) what is the probability that person chosen at random had either type A or type B or type O blood group? 2m

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