



INDIAN SCHOOL AL WADI AL KABIR

MIDTERM EXAMINATION

Subject: Mathematics (041)

Set-2

Class: X

Date: 22/09/2026

Max. Marks: 80

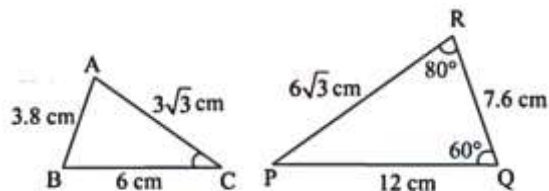
Time: 3 hours

General Instructions:

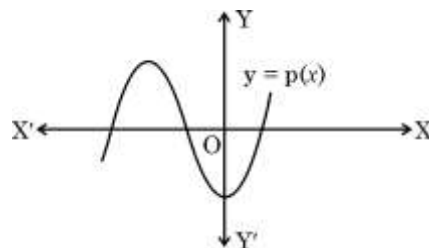
1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each.
8. All Questions are compulsory. However, an internal choice in 2 Questions of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Use of calculators is not allowed.

Q. No	Questions	Marks
SECTION A		
1	The probability of getting a composite number greater than 3 on throwing a die is: (A) $\frac{1}{6}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$	1
2	If in two triangles $\triangle DEF$ and $\triangle PQR$, $\angle D = \angle Q$ and $\angle R = \angle E$, then which of the following is not true? (A) $\frac{DE}{QR} = \frac{DF}{PQ}$ (B) $\frac{EF}{PR} = \frac{DF}{PQ}$ (C) $\frac{EF}{RP} = \frac{DE}{QR}$ (D) $\frac{DE}{PQ} = \frac{EF}{RP}$	1
3	The roots of the quadratic equation $(x - 1)^2 = 16$ are: (A) 5, 3 (B) 4, -4 (C) 5, -3 (D) -5, 3	1
4	If two positive integers p and q can be expressed as $p = 18 a^2 b^4$ and $q = 20 a^3 b^2$, where a and b are prime numbers, then LCM(p, q) is: (A) $2 a^2 b^2$ (B) $180 a^2 b^2$ (C) $12 a^2 b^2$ (D) $180 a^3 b^4$	1
5	The zeroes of a polynomial $x^2 + px + q$ are twice the zeroes of the polynomial $4x^2 - 5x - 6$. The value of p is: (A) $-\frac{5}{2}$ (B) $\frac{5}{2}$ (C) -5 (D) 10	1

- 6 $\triangle ABC$ and $\triangle PQR$ are shown in the adjoining figures. The measure of $\angle C$ is:



- (A) 140° (B) 80° (C) 60° (D) 40°
- 7 The pair of linear equations $9x - 15y + 19 = 0$ and $-3x + 5y - 9 = 0$ represents two lines which are :
 (A) intersecting exactly at one point (B) intersecting exactly at two points
 (C) coincident (D) parallel
- 8 Two of the vertices of $\triangle PQR$ are $P(-1, 5)$ and $Q(5, 2)$. The coordinates of a point which divides PQ in the ratio $2 : 1$ are :
 (A) $(3, -3)$ (B) $(5, 5)$ (C) $(3, 3)$ (D) $(5, 1)$
- 9 Given $HCF(2520, 6600) = 40$, $LCM(2520, 6600) = 252 \times k$, then the value of k is:
 (A) 1650 (B) 1600 (C) 165 (D) 1625
- 10 The value of 'p' for which the equations $px + 3y = p - 3$, $12x + py = p$ has infinitely many solutions is:
 (A) -6 only (B) 6 only (C) ± 6 (D) Any real number except ± 6
- 11 If the distance between the points $(4, p)$ and $(1, 0)$ is 5, then p is equal to:
 (A) ± 4 (B) 4 (C) -4 (D) 0
- 12 If mean of a frequency distribution is 7.5, $\sum f_i x_i = 120 + 3k$ and $\sum f_i = 30$, then the value of k is:
 (A) 45 (B) 50 (C) 35 (D) 40
- 13 Observe the graph of polynomial $p(x)$. Number of zeroes of $p(x)$ is:



- (A) 0 (B) 2 (C) 3 (D) 4
- 14 $A(-4, 5)$ and $C(8, 2)$ are the two opposite vertices of a parallelogram $ABCD$. Its diagonals intersect each other at $P(a, b)$. The relation between 'a' and 'b' is:
 (A) $b = a - 1.5$ (B) $b = a + 1.5$ (C) $b = a - 4.5$ (D) $b = a + 4.5$
- 15 $(3 \times 11 \times 13 + 3)$ is:
 (A) a prime number (B) divisible by 13
 (C) an odd number (D) a composite number
- 16 If mean and median of given set of observations are 10 and 11, respectively then the value of mode is:
 (A) 10.5 (B) 8 (C) 13 (D) 21

- 17 The pair of equations $x = a$ and $y = b$ graphically represents lines which are 1
(A) parallel **(B)** intersecting at (b, a)
(C) coincident **(D)** intersecting at (a, b)

- 18 The quadratic equation $x^2 - 4x + k = 0$ has distinct real roots if: 1
(A) $k = 4$ **(B)** $k > 4$ **(C)** $k = 16$ **(D)** $k < 4$

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.

- 19 **Assertion(A):** The number 12^n ends with digit 0 where 'n' is a natural number. 1

Reason(R): Any number ends with digit 0 if its prime factor is of the form $2^m \times 5^n$, where 'm' and 'n' are natural numbers.

- 20 **Assertion (A):** In a cricket match, a batsman hits a boundary 9 times out of 45 balls he plays. 1
The probability that in a given ball, he does not hit the boundary is $\frac{4}{5}$.

Reason(R): $P(E) + P(\text{not } E) = 1$

Section B

- 21 (a) If α and β are the zeroes of the polynomial $5x^2 - 16x - 10$. Find the value of 2
 $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$.

OR

- (b) If α and β are the zeroes of the polynomial $p(y) = y^2 - 5y + 3$, then find the value of 2
 $\alpha^4\beta^3 + \alpha^3\beta^4$.

- 22 One card is drawn at random from a well shuffled deck of 52 cards. Find the probability that 2
the card drawn is:

(i) a queen of hearts

(ii) is not a jack

- 23 Prove that $3 + \sqrt{2}$ is irrational, given $\sqrt{2}$ is irrational 2

- 24 (a) The product of Rehan's age (in years) 5 years ago and his age 7 years from now, is one 2
more than twice his present age. Find his present age.

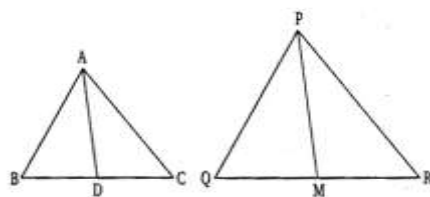
OR

- (b) If $x = -2$ is the common solution of quadratic equations $ax^2 + x - 3a = 0$ and 2
 $x^2 + bx + b = 0$, then find the value of a^2b .

- 25 If the zeroes of the polynomial $x^2 + ax + b$ are in the ratio 3 : 4, then prove that $12a^2 = 49b$. 2

SECTION C

- 26 Sides AB and BC and median AD of a $\triangle ABC$ are respectively proportional to sides PQ and QR and median PM of $\triangle PQR$. 3



Show that $\triangle ABC \sim \triangle PQR$.

- 27 (a) Find the coordinates of the points which divide the line segment joining A(-2, 2) and B(2, 8) into four equal parts. 3

OR

- (b) A point P(x, 7) divides a line segment joining the points A(-5, 4) and B(7, 9) in a certain ratio. Find the ratio and hence find the value of x. 3

- 28 (a) If p and q are zeroes of the polynomial $p(y) = 21y^2 - y - 2$, then find the value of $(1 - p) \times (1 - q)$ 3

OR

- (b) Find the zeroes of the polynomial $r(x) = 4x^2 + 3x - 1$. Hence, write a polynomial whose zeroes are reciprocal of the zeroes of polynomial r(x). 3

- 29 The perimeter of a rectangle is 70 cm. The length of the rectangle is 5 cm more than twice its breadth. Express the given situation as a system of linear equations in two variables and hence solve it. 3

- 30 Weekly expenditure on Ayurvedic medicines of few households in a locality is recorded below. 3

Weekly Expenditure (₹)	100-150	150-200	200-250	250-300	300-350
No. of households	4	5	y	2	2

If the mean expenditure for this is ₹ 211, then find the value of the missing frequency 'y'.

- 31 Find 2 consecutive odd numbers, sum of whose squares is 650. 3

SECTION D

- 32 (i) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. 5

- (ii) Using the above, find the value of x, if a line $DE \parallel BC$ intersects the sides AB and AC of $\triangle ABC$ such that $AD = x$, $DB = x - 2$, $AE = x + 2$ and $CE = x - 1$.

- 33 (a)(i) If P (2, 2), Q (– 4, –4) and R (5, – 8) are the vertices of a ΔPQR , then find the length of the median through R. 5
- (ii) Prove that the points A(7, 10), B(-2, 5), and C(3, -4) are the vertices of an isosceles right-angled triangle.

OR

- (b) Point P divides the line segment joining the points A(2, 1) and B(5, -8) such that $\frac{AP}{AB} = \frac{1}{3}$. If P lies on the line $2x - y + k = 0$, find the value of k 5
- 34 (a) Find the median and mode of the following distribution: 5

Class Interval	0-15	15-30	30-45	45-60	60-75	75-90	90-105
Frequency	15	10	12	9	8	10	6

OR

- (b) The median of the following data is 137. Find the values of x and y, given that total of frequencies is 68. 5

Class	65-85	85-105	105-125	125-145	145-165	165-185	185-205
Frequency	4	5	x	20	14	y	4

- 35 Draw the graphs of the following equations: 5
- $2x - y = 1$ and $3x + 2y = 12$

Determine the vertices of the triangle formed by the lines representing these equations and the x-axis.

SECTION E - Case Study Based Questions

- 36 Case Study Based 1:

A modified game of pool uses a set of 18 numbered balls (numbered 1 to 18) and one solid white cue ball. Of the 18 numbered balls, ten are solid-coloured and numbered 1 to 10, while eight are striped and numbered 11 to 18. The 18 numbered pool balls are placed in a large bowl and thoroughly mixed, then one ball is drawn out at random.



Based on this information, answer the following questions:

- (i) What is the probability that the drawn ball bears number 12? 1
- (ii) (a) What is the probability that the drawn ball bears an odd number? 2
- OR
- (ii) (b) What is the probability that the drawn ball bears a number that is a multiple of 4? 2
- (iii) What is the probability that the drawn ball is a striped ball and bears an even number? 1

- 37 Case Study Based 2: A passenger train travels a distance of 480 km at a uniform speed. On a particular day due to heavy rains, the speed of the train had to be reduced by 8 km/h, which resulted in the train taking 3 hours more to cover the same distance.



Based on the above information, answer the following questions:

(i) Write the algebraic expression representing the time taken (in hours) by the train to complete the journey at the reduced speed.

1

(ii) Formulate a general equation for this situation.

1

(iii)(a) Find the original speed of the train.

2

OR

(iii)(b) Find the original time taken by the train to complete the journey.

2

- 38 Case Study Based 3: The local education department is organizing a prestigious National Science Talent Search (NSTS) examination. A total of 210 students from the Physics stream, 252 students from the Chemistry stream, and 294 students from the Mathematics stream have registered for the event.



The organizing committee wants to arrange these students in different examination rooms such that:

1. Every room has the same number of students.
2. Every room contains students from only one specific stream.

Additionally, to coordinate the schedule, the committee has planned three events: the main orientation seminar is held every 15 minutes, the Chemistry lab safety briefing is held every 18 minutes, and the Mathematics symposium is held every 30 minutes. All three events begin simultaneously at 9:00 AM.

Based on the above information, answer the following questions:

(i) Write the sum of the powers of prime factors in the prime factorisation of 210.

1

(ii) (a) What is the maximum number of students that can be accommodated in each examination room to satisfy the given conditions?

2

OR

(ii) (b) At what earliest time will all three events (orientation seminar, safety briefing, and Mathematics symposium) commence together again?

2

(iii) Find the product of the HCF and LCM of the orientation seminar interval (15 minutes) and the Chemistry briefing interval (18 minutes).

1
