



DELHI INTERNATIONAL SCHOOL
HALF YEARLY EXAMINATION (2025-26)
SUBJECT – MATHEMATICS (041)
CLASS – X

GENERAL INSTRUCTIONS

- I. Read the question carefully before answering.
- II. The question paper consists of 38 questions divided into five sections A, B, C, D and E
- III. Section-A comprises of 20 questions of 1 mark each.
- IV. Section-B comprises of 5 questions of 2 marks each
- V. Section-C comprises of 6 questions of 3 marks each
- VI. Section-D comprises of 4 questions of 5 marks each
- VII. Section-E comprises of 3 questions of 4 marks each (case based study)

TIME: 3 HOURS

MM - 80

S.NO	SECTION – A	MARKS
1.	Which of the following is not irrational? a) $(2 - \sqrt{3})2$ b) $(\sqrt{2} + \sqrt{3})2$ c) $(\sqrt{2} - \sqrt{3})(\sqrt{2} + \sqrt{3})$ d) $27\sqrt{7}$	1
2.	D and E are respectively the points on the sides AB and AC of a triangle ABC such that AD = 2 cm, BD = 3 cm, BC = 7.5 cm and DE BC. Then, length of DE (in cm) is a) 2.5 b) 3 c) 5 d) 6	1
3.	The product of three consecutive positive integers is divisible by a) 4 b) 6 c) no common factor d) only 1	1
4.	If ΔABC is right angled at C, then the value of $\cos(A + B)$ is a) 0 b) 1 c) $1/2$ d) $\sqrt{3}/2$	1
5.	If the HCF of 65 and 117 is expressible in the form $65m - 117$, then the value of m is a) 4 b) 2 c) 1 d) 3	1

6.	The $(n - 1)^{\text{th}}$ term of an A.P. is given by 7, 12, 17, 22, ... is	1
a)	$5n + 2$	
b)	$5n + 3$	
c)	$5n - 5$	
d)	$5n - 3$	
7.	A quadratic polynomial, whose zeroes are -3 and 4, is	1
a)	$x^2 - x + 12$	
b)	$x^2 + x + 12$	
c)	$x^2/2 - x/2 - 6$	
d)	$2x^2 + 2x - 24$	
8.	If p, q, r and s are in A.P. then $r - q$ is	1
a)	$s - p$	
b)	$s - q$	
c)	$s - r$	
d)	none of these	
9.	The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are	1
a)	both positive	
b)	both negative	
c)	one positive and one negative	
d)	both equal	
10.	The quadratic equation whose one rational root is $3 + \sqrt{2}$ is	1
a)	$x^2 - 7x + 5 = 0$	
b)	$x^2 + 7x + 6 = 0$	
c)	$x^2 - 7x + 6 = 0$	
d)	$x^2 - 6x + 7 = 0$	
11.	If $y \sin 45^\circ \cos 45^\circ = \tan 45^\circ - \cos^2 30^\circ$, then $y = \dots$	1
a)	-12	
b)	12	
c)	-2	
d)	2	
12.	If one root of the quadratic equation $2x^2 + kx - 6 = 0$ is 2, the value of k is	1
a)	1	
b)	-1	
c)	2	
d)	-2	

13.	If $\cos X = \frac{2}{3}$ then $\tan X$ is equal to: a) $\frac{5}{2}$ b) $\sqrt{5}/2$ c) $\sqrt{5}/2$ d) $2/\sqrt{5}$	1
14.	If a pair of linear equations is consistent, then the lines will be a) always coincident b) parallel c) always intersecting d) intersecting or coincident	1
15.	$5 \tan^2 A - 5 \sec^2 A + 1$ is equal to a) 6 b) -5 c) 1 d) -4	1
16.	If $x = a, y = b$ is the solution of the equations $x + y = 5$ and $2x - 3y = 4$, then the values of a and b are respectively a) 6, -1 b) 2, 3 c) 1, 4 d) $19/5, 6/5$	1
17.	If the height and length of a shadow of a tower are the same, then the angle of elevation of Sun is a) 30° b) 60° c) 45° d) 15°	1
18.	If a tower 6m high casts a shadow of $2\sqrt{3}$ m long on the ground, then the sun's elevation is: a) 60° b) 45° c) 30° d) 90°	1
19.	Assertion (A): $x^2 + 7x + 12$ have no real zeroes. Reason (R): A quadratic polynomial can have at the most two zeroes. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). Assertion (A) is true, but Reason (R) is false. Assertion (A) is false but Reason (R) is true.	1

20. Assertion (A): If $\cos A + \cos^2 A = 1$, then $\sin^2 A + \sin^4 A = 1$
 Reason (R): $\sin^2 A + \cos^2 A = 1$
 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.

1

SECTION – B

21. Half the difference between two numbers is 2. The sum of the greater number and the twice the smaller number is 13. Find the numbers. 2

22. If one root of the equation $(k-1)x^2 - 10x + 3 = 0$ is the reciprocal of the other, then find the value of k . 2

23. Find the zeroes of the polynomial $6x^2 - 5x - 1$. Hence, obtain a polynomial each of whose zeroes is three times the zeroes of the given polynomial. 2

24. Find the middle term of A.P 6, 13, 20, ..., 230. 2

25. Prove that $\sqrt{2} + \sqrt{3}$ is irrational. 2

SECTION – C

26. The monthly income of Aryan and Babban are in the ratio 3:4 and their monthly expenditures are in ratio 5:7. If each saves ₹ 15,000 per month, find their monthly incomes. 3

OR

Solve the following system of equations graphically: $2x + y = 6$, $2x - y - 2 = 0$. Find the area of the triangle so formed by two lines and x - axis.

27. If $\sin \theta + \cos \theta = \sqrt{3}$, then prove that $\tan \theta + \cot \theta = 1$ 3

28. Find the value(s) of p for which the quadratic equation given as $(p+4)x^2 - (p+1)x + 1 = 0$ has real and equal roots. Also, find the roots of the equation(s) formed. 3

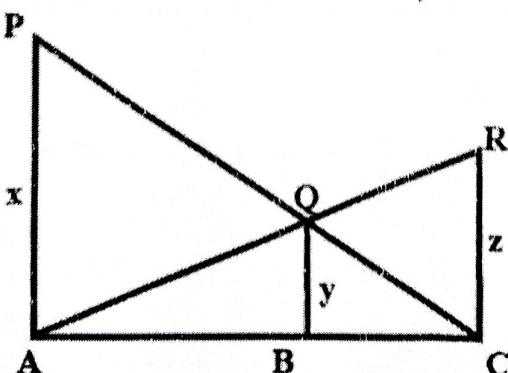
29. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108, respectively. Find the minimum number of rooms required if in each room the same numbers of participants are to be seated and all of them being in the same subject. 3

30. (A) In the given figure, PA, QB and RC are perpendicular to AC. If $PA = x$ units, $QB = y$ units and $RC = z$ units, Prove that $\frac{1}{x} + \frac{1}{z} = \frac{1}{y}$. 3

3

3

3



OR

(B) Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of Δ PQR. Show that $\Delta ABC \sim \Delta PQR$.

31.	The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.	3
SECTION – D		
32.	Determine graphically the coordinates of vertices of a triangle, the equation of whose sides are given by $2y - x = 8$, $5y - x = 14$ and $y - 2x = 1$.	5
33.	Express the equation $\frac{x-2}{x-3} + \frac{x-4}{x-5} = \frac{10}{3}$; (x is not equal to 3,5) as a quadratic equation in standard form. Hence, find the roots of the equation so formed.	5
34.	Prove that $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$	5
35.	(A) State and prove Basic Proportionality Theorem. (B) In the given figure $\angle CEF = \angle CFE$. F is the midpoint of DC. Prove that $\frac{AB}{BD} = \frac{AE}{FD}$.	3 2
SECTION – E		
36.	While designing the school yearbook, a teacher asked the student that the length and width of a particular photo be increased by n units each to double the area of the photo. The original photo is 18 cm long and 12 cm wide. Based on the above information. Answer the following Questions: i Write an algebraic equation depicting the above information. ii Write the corresponding quadratic equation in standard form. iii What should be the new dimensions of the enlarged photo?	1 1 2
	OR	
	Can any rational value of x make the new area equal to 220 cm^2 ?	2
37.	In a class, the teacher asks every student to write an example of A.P. Two boys Aryan and Roshan write the progression as $-5, -2, 1, 4, \dots$ and $187, 184, 181, \dots$ Respectively. Now the teacher asks his various students the following questions on progression. Help the students to find answers for the following: i. Find the sum of the common difference of two progressions. ii. Find the 34th term of progression written by Roshan. iii. (A) Find the sum of first 10 terms of the progression written by Aryan. OR (B) Which term of the progressions will have the same value?	1 1 2 2

38. India gate (formerly known as All India war memorial) is located near Karthavya path. (formerly Rajpath) at New Delhi. It stands as a memorial to 74187 soldiers of Indian Army, who gave their life in the first world war. This 42m tall structure was designed by Sir Edwin Lutyens in the style of Roman triumphal arches. A student Shreya of height 1 m visited India Gate as a part of her study tour.



i. What is the angle of elevation from Shreya's eye to the top of India Gate, if she is standing at a distance of 41m away from the India Gate? 1

ii. If Shreya observes the angle of elevation from her eye to the top of India Gate to be 60° , then how far is she standing from the base of the India Gate? 1

iii. (A) If the angle of elevation from Shreya's eye changes from 45° to 30° , when she moves some distance back from the original position. Find the distance she moves back. 2

OR

(B) If Shreya moves to a point which is at a distance of $41\sqrt{3}$ from the India Gate, then find the angle of elevation made by her eye to the top of India Gate. 2