DIRECTORATE OF EDUCATION, GNCT OF DELHI
MID-TERM PRACTICE PAPER (2026-27)
CLASS – X
SUBJECT – MATHEMATICS

Duration: 3 hours **Max. Marks: 80**

General Instructions:

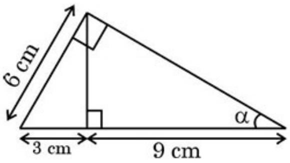
1. This Question Paper has 5 Sections 'A', 'B', 'C', 'D' and 'E'.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based questions (04 marks each) with sub parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E. You have to attempt only one optuion out of these given options.
8. Draw neat figures wherever required.
9. Take $\pi = \frac{22}{7}$ wherever required, if not stated.
10. There is no provision of negative marking.
11. Use of calculator is not permitted.

Please do write down the Serial Number of the question before attempting it.

SECTION A

Section A consists of twenty questions of 1 mark each.

1. The value of sin α from the given figure is:



(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{2}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{\sqrt{2}}$

2. S and T are points on sides PR and QR of $\triangle PQR$ such that $\angle P = \angle RTS$, then :
   (a) $\triangle RPQ \sim \triangle RTS$ (b) $\triangle PQR \sim \triangle STR$
   (c) $\triangle RQP \sim \triangle TRS$ (d) $\triangle PRQ \sim \triangle TSR$

3. The HCF and LCM of 10,24 and 72 are respectively:
   (a) 1,720 (b) 1,360 (c) 2,360 (d) 2,720

4. Reema and Kavi were born in August 2018. The probability that they have same date of birth is:
   (a) $\frac{1}{30}$ (b) $\frac{30}{31}$ (c) $\frac{10}{31}$ (d) $\frac{1}{31}$

5. The distance of a point A from x-axis is 3 units. Which of the following cannot be coordinates of the point A?
   (a) (-3,3) (b) (3,-3) (c) (3, -1) (d) (1,3)

6. The value of $\frac{\cot 45^0 - \sin 30^0}{2\sin 30^0 + \cos 60^0}$ is :

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{5}$ (c) $\frac{\sqrt{2}}{3}$ (d) $\frac{1}{3}$

7. $(\sqrt{5})^2 - (1 - \sqrt{3})^2$ equals :

(a) $2(2\sqrt{3} + 1)$ (b) $\sqrt{3} + 1$ (c) $2 + \sqrt{3}$ (d) $2\sqrt{3} + 1$

8. Gulnaaz read 100 pages of a book. From 12th May, she decided to read 5 pages per day. On 20th May, she has completed:

(a) 140 pages (b) 145 pages (c) 155 pages (d) 160 pages

9. If the system of equations $(a - b)x + by = 4$ & $12x + 8y = 16$ has infinitely many solutions, then:

(a) $a + b = 7$ (b) $ab = 25$ (c) $a = b + 2$ (d) $5a = 2b$

10. Which of the following is true?

(a) $\cot\theta = \tan\theta$ (b) $\sin^2\theta = 1 + \cos^2\theta$

(c) $\tan^2\theta - \cot^2\theta = 1$ (d) $\sec^2\theta = 1 + \tan^2\theta$

11. The points P(3, 6), Q(k, 2) and R(6, 2) are the vertices of a triangle right-angled at Q. The value of k is :

(a) 6 (b) 5 (c) 4 (d) 3

12. The probability that a 2-digit number less than 80, selected at random will be a multiple of 2 and 3 but not a multiple of 5, is:

(a) $\frac{3}{20}$ (b) $\frac{13}{80}$ (c) $\frac{11}{80}$ (d) $\frac{1}{7}$

13. The solution of the pair of linear equations $2x + 3y = 12$; $5x - 3y = 9$ is :

(a) $x = 2, y = 3$ (b) $x = 3, y = 2$ (c) $x = 5, y = 3$ (d) $x = 3, y = 5$

14. The LCM of $p = x^2y^3$, $q = xy^4$ where x and y be two different prime numbers, is:

(a) x^3y^7 (b) x^2y^4 (c) xy^3 (d) xy

15. Two dice are thrown simultaneously. The probability that the difference between the numbers on the two dice being 1 is:

(a) $\frac{1}{3}$ (b) $\frac{4}{18}$ (c) $\frac{1}{2}$ (d) $\frac{5}{18}$

16. If $\cot\theta = \frac{3}{4}$ then $\sin\theta$ is equal to :

(a) $\frac{1}{5}$ (b) $\frac{3}{5}$ (c) $\frac{4}{5}$ (d) $\frac{4}{3}$

17. The pair of linear equations $3x - 15y = 7$ and $2x - 10y = \frac{14}{3}$ represents two lines which are :

(a) parallel
(b) coincident
(c) intersecting exactly at one points.
(d) intersecting exactly at two points.

18. The common difference of the AP $\sqrt{27}$, $\sqrt{75}$, $\sqrt{147}$ .... is:

(a) $2\sqrt{3}$ (b) $3\sqrt{3}$ (c) $4\sqrt{3}$ (d) $5\sqrt{3}$

Directions for Q 19 & 20 : There is one Assertion (A) and one Reason (R). Choose the correct answer of these questions from the four options (a),(b),(c) and (d) given below :

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the assertion (A).

(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of the 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 points (a,a), (-a,-a) and (-a,a) are the vertices of an equilateral triangle .
Reason (R) : If three points P, Q and R are collinear, then PQ + QR = PR.

20. Assertion (A) : tan 2A = 3 tan A is true, when the measure of A is 60°.
Reason (R) : $\tan 30^0 = \frac{1}{\sqrt{3}}$.

<u>SECTION –B</u>

Section B consists of five questions of 2 marks each.

21. Explain why 7 × 11 × 13 + 13 and 7 × 6 × 5 × 4 × 3 × 2 × 1 + 5 are composite numbers.

OR

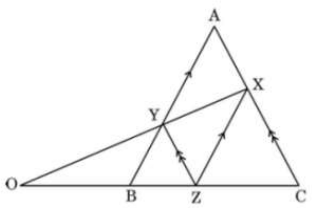
Three bells toll at intervals of 9, 12, and 15 minutes, respectively. If they start tolling together,after what time will they next toll together?

22. A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower.

23. In triangle PQR, S and T are points on sides PQ and PR respectively such that ST || QR. If PS = 4 cm, SQ = (3x - 4) cm, PT = 8 cm, and TR = (x + 2) cm, find the value of x.

OR

In the given figure, Z is a point on the side BC of △ABC such that XZ∥AB and YZ || AC. If XY and CB are produced to meet at O, then prove that $ZO^2 = OB \times OC$.



24. A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower. (Take √3 = 1.732)

25. The LCM of two numbers is 182 and their HCF is 13. If one of the numbers is 26.Then find the other number.

SECTION – C

Section C consists of six questions of 3 marks each.

26. Prove that $2 + 3\sqrt{5}$ is an irrational number given that $\sqrt{5}$ is an irrational number.

27. Solve the following pair of linear equations for x and y:

$$141x + 93y = 189$$
$$93x + 141y = 45$$

28. How many terms of the AP: -15, -13, -11...... are needed to make the sum -55? Explain the reason for the double answer.

OR

The 8th term of an AP is 37 and the 15^{th} term is 15 more than the 12^{th} term. Find the AP. Hence find the sum of the first 15 terms of the AP.

29. Find the ratio in which the y-axis divides the line segment joining the points (-4, -6) and (10, 12). Also find the coordinates of the point of division.

OR

Show that A(-3,2), B(-5,-5), C(2,-3) and D(4,4) are the vertices of a rhombus.

30. If $\tan\alpha = \frac{1}{\sqrt{7}}$, then find the value of $\frac{cosec^2\alpha + sec^2\alpha}{cosec^2\alpha - sec^2\alpha}$.

31. Cards numbered from 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn card is:
    a) an odd number
    b) a perfect square number
    c) a prime number less than 23.

SECTION – D

Section D consists of four questions of 5 marks each.

32. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides, then the two sides are divided in the same ratio.

33. A fraction becomes $\frac{1}{3}$, if 2 is added to both numerator and denominator. If 3 is added to both numerator and denominator, it becomes $\frac{2}{5}$. Find the fraction.

OR

Solve the following system of equations graphically and from the graph, find the points where these lines intersect the y-axis:

$$x - 2y = 2$$
$$3x + 5y = 17$$

34. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 60 m high, find the height of the building.

35. If $x = a\cos\theta + b\sin\theta$ and $y = b\cos\theta - a\sin\theta$, then prove that $x^2 + y^2 = a^2 + b^2$.

OR

If sin(A+B)=1 and tan(A-B)=$\frac{1}{\sqrt{3}}$, find the value of:

(i) tan A + cot B

(ii) sec A – cosec B

SECTION – E

Section E has three case based questions of 4 marks each.

36. During a school sports meet, a volunteer coordinates a lucky draw game to raise funds. A bag contains 50 tokens numbered from 1 to 50. Participants pay a small fee to draw a single token at random. The organizers offer three tiers of prizes depending on the property of the drawn number. Prime numbers win a small souvenir, perfect squares win a sports kit, and multiples of 11 win a bumper prizebicycle. The volunteer carefully keeps track of every drawn token, ensuring no replacement occurs during a single round. This engaging setup helps students practically understand how event constraints and sample spaces directly affect their likelihood of winning.

Observe the pattern and answer the questions below:

(i) Find the probability of a participant winning a bumper prize bicycle on the very first draw. 1

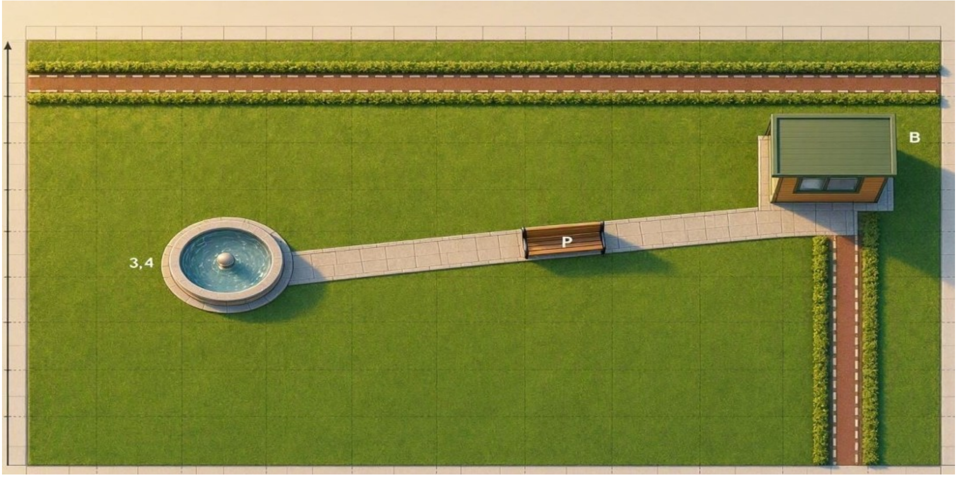
(ii) Find the probability that the first drawn token contains a number which is a multiple of 5. 1

(iii) Find the probability that the first drawn token wins either a small souvenir or a sports kit. 2

OR

If the first participant draws token number 25 and takes it away, find the probability that the next participant draws a token that is a perfect square number.

37. To enhance the green cover of a newly constructed housing society in Delhi, the resident welfare association plans a rectangular sports park. The park layout is plotted on a coordinate plane, with the main entry gate chosen as the origin (0, 0). Two jogging tracks run parallel to the boundary axes. A standard fountain is installed at point A (3, 4), and a security guard cabin is built at point B (9, 10). A straight stone pathway directly connects the fountain to the security cabin. To provide seating for senior citizens, the management decides to place a wooden bench at point P along this pathway.



Based on the above information, answer the following questions:

(i) Find the distance of the fountain A from the main entry gate. 1

(ii) Find the coordinates of the midpoint of the stone pathway connecting fountain A and security cabin B. 1

(iii) If the wooden bench P divides the pathway AB internally in the ratio 1:2, find the coordinates of point P. 2

OR

Find a relation between x and y such that a point (x, y) is equidistant from the fountain A and the security cabin B.

38. A construction company is building a high-rise apartment complex. They plan to complete a certain number of floors each month. In the first month, they complete 4 floors. Due to increased efficiency and workforce, they manage to increase their production by a fixed number of 3 floors every subsequent month. The project manager tracks this progress monthly to ensure they meet their year-end deadline. This steady increase in completed floors forms a clear sequence that helps the company calculate future target, total floors built, and required raw materials accurately.

Based on the above information, answer the following questions:

(i) Find the common difference (d) and the first term (a) of the given arithmetic progression. 1

(ii) Write the standard formula to find the nth term of the given arithmetic progression. 1

(iii) Find the number of floors completed in the 10th month. 2

OR

Calculate the total number of floors completed by the company by the end of the 12th month.