SECOND TERM SUMMATIVE ASSESSMENT 2026-27

MODEL QUESTION PAPER

MATHEMATICS

Std: X SET 1 **Score: 80**

Cool-off time: 15 minutes **Time: 2½ Hours**

Instructions

- Use the first 15 minutes to read the questions and think about the answers.
- There are 27 questions in 5 sections, A, B, C, D and E.
- Answer all questions. In questions of the type "A or B", answer only one.
- Explain your answers wherever necessary. Irrationals like $\sqrt{2}$, $\sqrt{3}$ need not be approximated unless asked.

Section A

This section has 8 questions of 1 score each. Choose the correct answer. (8 × 1 = 8)

1. The algebraic form of an arithmetic sequence is 4n + 3. What is its common difference? (1)

A. 3 B. 4 C. 7 D. −4

2. Which point is on the x-axis at a distance of 5 units from the origin? (1)

A. (0, 5) B. (5, 5) C. (5, 0) D. (0, −5)

3. What is the value of sin 30°? (1)

A. 1/2 B. $\sqrt{3}/2$ C. 1 D. $1/\sqrt{2}$

4. PA and PB are tangents to a circle with centre O. If ∠APB = 70°, then ∠AOB = (1)

A. 70° B. 110° C. 140° D. 35°

5. What are the solutions of $x^2 - 5x + 6 = 0$? (1)

A. 1, 6 B. −2, −3 C. 2, 3 D. −1, 6

6. If $p(x) = x^3 - 2x^2 + x - 5$, then $p(1)$ = (1)

A. −5 B. 5 C. −3 D. 0

7. Read the statements. (1)

Statement I: The distance between the points (0, 0) and (3, 4) is 5.

Statement II: The distance between two points is found using Pythagoras' theorem on the right triangle formed with lines parallel to the axes.

A) Statement I is true and statement II is false.

B) Statement I is false and statement II is true.

C) Both statements are true and statement II is the reason for statement I.

D) Both statements are true but statement II is not the reason for statement I.

8. Read the statements. (1)

Statement I: When two chords AB and CD of a circle intersect at P inside the circle, PA × PB = PC × PD.

Statement II: The perpendicular from the centre of a circle to a chord bisects the chord.

A) Statement I is true and statement II is false.

B) Statement I is false and statement II is true.

C) Both statements are true and statement II is the reason for statement I.

D) Both statements are true but statement II is not the reason for statement I.

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Section B

9. A box contains 15 red balls and 10 blue balls. A ball is taken from it without looking. (3)
(i) What is the probability of getting a red ball?
(ii) How many blue balls should be added so that the probability of getting a red ball becomes 1/2?

10. The 5th term of an arithmetic sequence is 17 and its 9th term is 33. (4)
(i) Find the common difference.
(ii) Find the first term and the 20th term.
(iii) Find the sum of the first 20 terms.

Section C

11. A(1, 2) and B(7, 10) are two points. (3)
(i) Find the length of AB.
(ii) Find the coordinates of the midpoint of AB.

12. The sides of a rectangle ABCD are parallel to the axes. The coordinates of A are (1, 1) and those of the opposite vertex C are (6, 4). (3)
(i) Write the coordinates of B and D.
(ii) Find the perimeter of the rectangle.

13. A. A circle is drawn with centre (2, 3) and radius 5. (4)
(i) Is (5, 7) a point on this circle? Why?
(ii) Find the coordinates of the other end of the diameter through (5, 7).
(iii) Write the coordinates of the two points on the circle that lie on the line x = 2.

OR

B. The vertices of a triangle are A(2, 1), B(6, 1) and C(6, 4).
(i) Find the lengths of AB, BC and AC.
(ii) Is it a right triangle? Why?
(iii) Find its area.

14. (i) Draw coordinate axes and mark the points P(1, 2), Q(5, 2), R(5, 6) and S(1, 6). (4)
(ii) What kind of quadrilateral is PQRS?
(iii) Find its area and the length of a diagonal.

Section D

15. Solve the equation $x^2 + 2x - 15 = 0$. (3)

16. A. The sum of a number and its reciprocal is 10/3. (4)
(i) Form a second degree equation.
(ii) Find the number.

OR

B. The length of a rectangle is 3 metres more than its breadth. Its area is 54 square metres.
(i) Form a second degree equation.
(ii) Find the length and breadth.

17. Consider the polynomial $p(x) = x^3 - 3x^2 + 4$. (4)
(i) Find p(2).
(ii) Is x − 2 a factor of p(x)? Why?
(iii) Write p(x) as a product of first degree factors.

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18. The product of Ammu's present age and her age 5 years ago is 84. (5)

(i) Taking her present age as x, form an equation.

(ii) Find her present age.

(iii) What will be her age after 3 years?

Section E

19. A. Prove that the opposite angles of a cyclic quadrilateral are supplementary. (3)

OR

B. O is the centre of a circle and A, B, C, D are points on it, with C on the larger arc AB and D on the smaller arc AB. If ∠AOB = 100°, find ∠ACB and ∠ADB.

20. Two chords AB and CD of a circle intersect at P. PA = 6 cm, PB = 4 cm and PC = 3 cm. (3)

(i) Find PD.

(ii) Find the length of the chord CD.

21. A. From a point P, 13 cm from the centre O of a circle of radius 5 cm, a tangent PT is drawn. (4)

(i) What is the measure of ∠OTP? Why?

(ii) Find the length of PT.

(iii) Find the area of triangle OTP.

OR

B. A circle touches all the sides of triangle ABC. AB = 8 cm, BC = 10 cm and CA = 12 cm. Find the lengths of the tangents from A, B and C to the circle.

22. In a right triangle, the hypotenuse is 10 cm and one angle is 30°. (4)

(i) Find the lengths of the other two sides.

(ii) Find the area of the triangle.

23. A. A boy 1.5 m tall, standing 20 m away from a tower, sees its top at an angle of elevation of 60°. (4)

(i) Draw a rough figure.

(ii) Find the height of the tower. ($\sqrt{3} \approx 1.73$)

OR

B. From the top of a building 30 m high, a car on the road is seen at an angle of depression of 30°.

(i) Draw a rough figure.

(ii) How far is the car from the foot of the building? ($\sqrt{3} \approx 1.73$)

24. A. PA and PB are tangents from P to a circle with centre O and radius 6 cm. ∠APB = 60°. (5)

(i) Find ∠AOB.

(ii) Find the length of PA.

(iii) Find OP.

(iv) Find the area of the quadrilateral OAPB.

OR

B. In a circle of radius 8 cm, a chord AB makes an angle of 120° at the centre O.

(i) Find the length of AB.

(ii) Find the distance of AB from the centre.

(iii) Find the area of triangle OAB.

25. Draw a circle of radius 3 cm and mark a point P, 7 cm from its centre. Draw the tangents from P to the circle and measure their length. (3)

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26. Draw a triangle with sides 5 cm, 6 cm and 7 cm, and draw its incircle. Measure the radius of the incircle. (4)

27. (i) P is a point outside a circle. A line through P cuts the circle at A and B, and PT is a tangent from P. If PA = 4 cm and AB = 5 cm, find PT. (5)

(ii) Draw a rectangle of length 6 cm and breadth 4 cm. Construct a square of the same area.

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