Class 10 Mathematics — Practice Set

Board Exam Pattern | Theory Paper

Maximum Marks: 80 **Time Allowed: 3 Hours**

General Instructions

1. All questions are compulsory. The paper has five sections: A, B, C, D and E.
2. Section A: 1-mark questions (MCQ / Assertion-Reason). Section B: 2-mark questions. Section C: 3-mark questions. Section D: 5-mark questions. Section E: 4-mark case-based questions.
3. Internal choice is provided in some questions of Sections B-E — attempt only one of the choices.
4. Use of calculators is not permitted.
5. This is a practice set for self-assessment; always cross-check the latest pattern with your board's official sample paper.

SECTION A

Questions 1 to 20 carry 1 mark each.

1. The HCF of 12 and 18 is (a) 2 (b) 3 (c) 6 (d) 36

2. The decimal expansion of 7/8 is (a) terminating (b) non-terminating recurring (c) non-terminating non-recurring (d) not defined

3. The number of zeroes of the polynomial $p(x) = x^2 - 4$ is (a) 0 (b) 1 (c) 2 (d) 3

4. The pair of equations $x + y = 5$ and $2x + 2y = 10$ has (a) a unique solution (b) no solution (c) infinitely many solutions (d) exactly two solutions

5. The roots of the quadratic equation $x^2 - 5x + 6 = 0$ are (a) 2, 3 (b) −2, −3 (c) 1, 6 (d) −1, −6

6. The common difference of the AP 3, 7, 11, 15, ... is (a) 3 (b) 4 (c) 7 (d) 11

7. The distance between the points (0, 0) and (3, 4) is (a) 5 (b) 7 (c) 1 (d) 25

8. In a right triangle, if one acute angle is 30°, the other acute angle is (a) 30° (b) 45° (c) 60° (d) 90°

9. The value of $\sin 30°$ is (a) 1/2 (b) $\sqrt{3}/2$ (c) 1 (d) 0

10. If two triangles are similar, their corresponding sides are (a) equal (b) proportional (c) perpendicular (d) parallel

11. The length of the tangent from a point to a circle of radius 6 cm, at a distance of 10 cm from the centre, is (a) 4 cm (b) 6 cm (c) 8 cm (d) 16 cm

12. The area of a circle of radius 7 cm is (take $\pi = 22/7$) (a) 154 cm^2 (b) 44 cm^2 (c) 22 cm^2 (d) 49 cm^2

13. The curved surface area of a cylinder of radius r and height h is (a) $\pi r^2 h$ (b) $2\pi rh$ (c) $2\pi r^2$ (d) πrh

14. The mode of the data 2, 3, 3, 4, 5, 3, 6 is (a) 2 (b) 3 (c) 4 (d) 6

15. A die is thrown once. The probability of getting an even number is (a) 1/6 (b) 1/3 (c) 1/2 (d) 2/3

16. If the sum of the first n natural numbers is 55, then n equals (a) 9 (b) 10 (c) 11 (d) 12

17. The discriminant of the quadratic equation $2x^2 - 4x + 1 = 0$ is (a) 8 (b) 4 (c) 16 (d) 2

18. The coordinates of the midpoint of the segment joining (2, 4) and (6, 8) are (a) (4, 6) (b) (8, 12) (c) (2, 2) (d) (3, 4)

19. Assertion (A): The number 6^n can never end with the digit 0 for any natural number n. Reason (R): A number ends in 0 only if it has both 2 and 5 as prime factors. (a) Both A and R true, R explains A (b) Both true, R does not explain A (c) A true, R false (d) A false, R true

20. Assertion (A): The points (1, 1), (2, 2) and (3, 3) are collinear. Reason (R): Three points are collinear if the area of the triangle they form is zero. (a) Both A and R true, R explains A (b) Both true, R does not explain A (c) A true, R false (d) A false, R true

SECTION B

Questions 21 to 25 carry 2 marks each.

21. Find the HCF and LCM of 96 and 404 by the prime factorisation method.

22. Find the roots of the quadratic equation $6x^2 - x - 2 = 0$.

23. Find the 11th term of the AP: 5, 8, 11, 14, ...

24. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact (state the result and the key idea).

25. If $\sin\theta = 3/5$, find the value of $\cos\theta$ and $\tan\theta$.

SECTION C

Questions 26 to 31 carry 3 marks each.

26. Prove that $\sqrt{5}$ is an irrational number.

27. Solve the pair of linear equations: $2x + 3y = 11$ and $2x - 4y = -24$.

28. The sum of the 4th and 8th terms of an AP is 24, and the sum of the 6th and 10th terms is 44. Find the AP.

29. Prove that the lengths of tangents drawn from an external point to a circle are equal.

30. Prove the identity: $(1 + \tan^2\theta) / (1 + \cot^2\theta) = \tan^2\theta$.

31. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC.

SECTION D

Questions 32 to 35 carry 5 marks each. Internal choice provided.

32. (a) A motor boat whose speed in still water is 18 km/h takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream. OR (b) The difference of squares of two numbers is 180 and the square of the smaller number is 8 times the larger. Find the two numbers.

33. (a) State and prove the Basic Proportionality Theorem (Thales' theorem). OR (b) Prove that in a right triangle, the square of the hypotenuse equals the sum of the squares of the other two sides.

34. (a) From the top of a 7 m high building, the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45°. Find the height of the tower. OR (b) The angles of elevation of the top of a tower from two points at distances 4 m and 9 m from the base, in the same straight line, are complementary. Find the height of the tower.

35. (a) A solid is in the shape of a cone mounted on a hemisphere of the same base radius 7 cm. If the total height of the solid is 21 cm, find its total volume. OR (b) The following table gives the marks of 50 students; find the mean marks using a suitable method: (0-10: 4, 10-20: 8, 20-30: 14, 30-40: 16, 40-50: 8).

SECTION E

Questions 36 to 38 are case-based, carrying 4 marks each.

36. Case study. A ladder leans against a wall. The foot of the ladder is 6 m from the wall and the ladder reaches 8 m up the wall. (i) Find the length of the ladder. (ii) Name the theorem used. (iii) If the foot is moved 2 m closer to the wall, will the ladder reach higher or lower? (iv) Write the relation between the three sides.

37. Case study. A school collects a one-time fee that follows an AP across classes: Class 6 pays Rs 1200, Class 7 pays Rs 1400, and so on, increasing by a fixed amount each class. (i) Write the common difference. (ii) Find the fee for Class 10. (iii) Find the total fee collected from Classes 6 to 10 (one student each). (iv) Which class pays Rs 2000?

38. Case study. A bag contains 5 red, 8 blue and 7 green marbles. One marble is drawn at random. (i) Find the total number of marbles. (ii) Find the probability the marble is red. (iii) Find the probability the marble is not green. (iv) Find the probability the marble is blue or green.