CBSE Class 10 Mathematics · Sample Paper 2 (2026-27 pattern)

Time: 3 hours · Maximum marks: 80 · CBSE Math Revision (not an official CBSE paper)

General instructions

1. This question paper contains 38 questions. All questions are compulsory.
2. The paper is divided into five sections: A, B, C, D and E.
3. Section A: questions 1–18 are MCQs and questions 19–20 are Assertion–Reason based, 1 mark each.
4. Section B: questions 21–25 are very short answer (VSA) questions of 2 marks each.
5. Section C: questions 26–31 are short answer (SA) questions of 3 marks each.
6. Section D: questions 32–35 are long answer (LA) questions of 5 marks each.
7. Section E: questions 36–38 are case study based questions of 4 marks each, with sub-parts of 1, 1 and 2 marks.
8. There is no overall choice. Internal choice is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and in the 2-mark sub-part of each case study in Section E.
9. Draw neat figures wherever required. Take $\pi = \dfrac{22}{7}$ wherever required, unless stated otherwise.
10. Use of calculators is not allowed.

Section A

20 marks

Questions 1 to 20 carry 1 mark each. Questions 1 to 18 are multiple choice questions (MCQs); questions 19 and 20 are Assertion–Reason based questions.

1. If α and β are the zeroes of $3x^2 + 5x - 2$, then $\alpha + \beta + \alpha\beta$ equals **1**

(a) $-\dfrac{7}{3}$ **(b)** -1

(c) 1 **(d)** $\dfrac{7}{3}$

2. A quadratic polynomial whose zeroes are -3 and $\dfrac{5}{2}$ is **1**

(a) $2x^2 - x - 15$ **(b)** $2x^2 + x - 15$

(c) $2x^2 + 11x + 15$ **(d)** $x^2 + x - 15$

3. The pair of equations $x - 2y = 3$ and $3x - 6y = 9$ has **1**

(a) a unique solution **(b)** no solution

(c) infinitely many solutions **(d)** exactly two solutions

4. The quadratic equation $kx^2 - 6x + 1 = 0$ has two distinct real roots if **1**

(a) $k < 9$ **(b)** $k < 9$ and $k \neq 0$

(c) $k > 9$ **(d)** $k = 9$

5. The sum of the first 10 terms of the AP whose first term is 12 and common difference is -5 is **1**

(a) 105 **(b)** -93

(c) -105 **(d)** -225

6. The number of terms of the AP $4, 9, 14, 19, \ldots$ that lie between 100 and 200 is **1**

(a) 19 **(b)** 20

(c) 21 **(d)** 40

7. The point $(k, 3)$ is at a distance of 5 units from $(2, -1)$. The possible values of k are **1**

(a) 5 or -1 **(b)** -5 or 1

(c) 3 only **(d)** 5 only

8. $M(2, 3)$ is the mid-point of AB, where A is $(-1, 7)$. The coordinates of B are **1**

(a) $(5, -1)$ **(b)** $(3, -4)$

(c) $(\frac{1}{2}, 5)$ **(d)** $(5, 1)$

9. $\triangle ABC \sim \triangle PQR$ with $\dfrac{AB}{PQ} = \dfrac{3}{4}$. If the perimeter of $\triangle PQR$ is 48 cm, the perimeter of $\triangle ABC$ is **1**

(a) 27 cm **(b)** 36 cm

(c) 64 cm **(d)** 44 cm

10. From a point P at a distance of 17 cm from the centre of a circle of radius 8 cm, a tangent is drawn. The length of the tangent is **1**

(a) 9 cm **(b)** 12 cm

(c) 15 cm **(d)** $\sqrt{353}$ cm

11. If $\sin\theta = \cos\theta$ with $0^\circ < \theta < 90^\circ$, then $2\tan^2\theta + \sin^2\theta - 1$ equals **1**

(a) $\dfrac{1}{2}$ **(b)** 1

(c) $\dfrac{3}{2}$ **(d)** 2

12. $(\sec^2\theta - 1)(1 - \sin^2\theta)$ is equal to **1**

(a) $\cos^2\theta$ **(b)** $\sin^2\theta$

(c) $\tan^2\theta$ **(d)** 1

13. The angle of elevation of the top of a 30 m high tower from a point on level ground is 60°. The distance of the point from the foot of the tower is **1**

(a) 10 m **(b)** 15 m

(c) $10\sqrt{3}$ m **(d)** $30\sqrt{3}$ m

14. The perimeter of a sector of a circle of radius 7 cm with central angle 90° is $\left(\pi = \dfrac{22}{7}\right)$ **1**

(a) 11 cm **(b)** 18 cm

(c) 25 cm **(d)** 36 cm

15. The volume of a hemispherical bowl of internal radius 9 cm is **1**

(a) $243\pi \text{ cm}^3$ **(b)** $486\pi \text{ cm}^3$

(c) $729\pi \text{ cm}^3$ **(d)** $972\pi \text{ cm}^3$

16. The largest possible hemisphere is scooped out of one face of a solid cube of edge 7 cm. The total surface area of the solid **1**

(a) decreases by 38.5 cm^2 **(b)** increases by 77 cm^2

(c) increases by 38.5 cm^2 **(d)** does not change

17. The mean of the distribution below is 5. The value of p is **1**

x	2	4	6	8
f	3	p	5	2

(a) 1 **(b)** 2

(c) 3 **(d)** 4

18. A card is drawn at random from a well-shuffled deck of 52 playing cards. The probability that it is a red face card is **1**

(a) $\dfrac{1}{26}$ **(b)** $\dfrac{3}{26}$

(c) $\dfrac{3}{13}$ **(d)** $\dfrac{6}{13}$

19. In the following question, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option. **1**

Assertion (A): For every natural number n, $\text{HCF}(n, n+1) = 1$.

Reason (R): For any two natural numbers a and b, $\text{HCF}(a, b) \times \text{LCM}(a, b) = a \times b$.

(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.

20. In the following question, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option. **1**

Assertion (A): The triangle with vertices $(0, 0)$, $(3, 0)$ and $(0, 4)$ has perimeter 12 units.

Reason (R): The distance between (x_1, y_1) and (x_2, y_2) is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

(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.

Section B

10 marks

Questions 21 to 25 are very short answer (VSA) type questions carrying 2 marks each. Internal choice is provided in 2 questions.

21. Using prime factorisation, find the HCF and LCM of 144 and 198, and verify that HCF $\times$ LCM $=$ product of the two numbers. **2**

22. Find the value of k for which the pair of equations $2x + ky = 5$ and $kx + 8y = 10$ has infinitely many solutions. **2**

OR

Solve by the substitution method: $x + 3y = 13$ and $4x - 5y = 1$.

23. In $\triangle ABC$, P and Q are points on AB and AC with $AP = 3$ cm, $PB = 6$ cm, $AQ = 2.5$ cm and $QC = 5$ cm. Is $PQ \parallel BC$? If $BC = 12$ cm, find PQ. **2**

24. If $5\cos\theta - 12\sin\theta = 0$, find the value of $\dfrac{\sin\theta + \cos\theta}{2\cos\theta - \sin\theta}$. **2**

OR

Find the acute angle A for which $2\sin^2 A = 3\cos A$.

25. The perimeter of a sector of a circle of radius 12 cm is $(24 + 4\pi)$ cm. Find the central angle of the sector and its area (in terms of π). **2**

Section C

18 marks

Questions 26 to 31 are short answer (SA) type questions carrying 3 marks each. Internal choice is provided in 2 questions.

26. Prove that $\sqrt{2}$ is irrational. Hence prove that $\dfrac{1}{\sqrt{2} - 1}$ is irrational. **3**

27. A rectangular vegetable plot has a perimeter of 46 m and a diagonal of 17 m. Find its length and breadth. **3**

28. The mid-point of the segment joining $A(2k, 1)$ and $B(4, k)$ lies on the line $x + 2y = 9$. Find k, the coordinates of A and B, and the length AB. **3**

OR

$M(3, 4)$ is the mid-point of the segment joining $P(-1, y)$ and $Q(x, 7)$. Find x, y and the length PQ.

29. In $\triangle ABC$, D and E are points on AB and AC with $DE \parallel BC$. The segments BE and CD intersect at O. Prove that $\triangle ODE \sim \triangle OCB$. If $AD : DB = 1 : 2$ and $DE = 5$ cm, find BC and $OD : OC$. **3**

30. If $\sec A + \tan A = 3$, find $\sec A - \tan A$, and hence find $\sin A$ and $\cos A$. **3**

OR

Prove that $\dfrac{1 - \tan^2 A}{1 + \tan^2 A} = \cos^2 A - \sin^2 A$, and hence find its value when $A = 30^\circ$.

31. Two circles with centres A and B and radii 9 cm and 4 cm touch each other externally. A common tangent (not through the point of contact) touches the circles at P and Q respectively. Find the length PQ. **3**

Section D

20 marks

Questions 32 to 35 are long answer (LA) type questions carrying 5 marks each. Internal choice is provided in 2 questions.

32. An open-air auditorium in Kochi has 20 seats in the first row, and each row after that has 2 more seats than the row in front of it. The auditorium has 1100 seats in all. (a) Find the number of rows. (b) How many seats are there in the last row? (c) How many seats are there in rows 11 to 20 (both inclusive)? **5**

33. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact. Using this result, answer: P is a point 29 cm from the centre O of a circle of radius 20 cm, and PA, PB are the two tangents from P. Find (a) the length of each tangent, (b) the area of quadrilateral $OAPB$. **5**

OR

In $\triangle PQR$, A and B are points on PQ and PR with $AB \parallel QR$. A line from P meets AB at N and QR at M. (a) Prove that $\dfrac{AN}{QM} = \dfrac{NB}{MR}$. (b) If $PA = 2$ cm, $AQ = 3$ cm, $QM = 6$ cm and $MR = 9$ cm, find AN and NB.

34. A storage shed has a cuboidal base 14 m long, 7 m wide and 4 m high, surmounted by a half-cylinder of diameter 7 m and length 14 m (the curved roof). $\left(\pi = \dfrac{22}{7}\right)$ (a) Find the volume of air inside the shed. (b) The inside walls, the two semicircular end-walls and the inside of the curved roof are to be painted at ₹20 per m². Find the cost (the floor is not painted). **5**

OR

A water tank is a cylinder of radius 1.4 m and height 3 m with a conical top of the same radius and height 1.05 m. $\left(\pi = \dfrac{22}{7}\right)$ (a) Find the capacity of the tank in litres. (b) Find the cost of painting its outer surface, excluding the base, at ₹60 per m².

35. A survey of 60 Class X students recorded their daily screen time (in minutes). **5**

Minutes	0–20	20–40	40–60	60–80	80–100	100–120
Students	4	8	20	12	11	5

(a) Find the mean screen time by the assumed-mean method. (b) Find the modal screen time. (c) Which of the two better describes a 'typical' student here? Give a reason.

Section E

12 marks

Questions 36 to 38 are case study based questions carrying 4 marks each (1 + 1 + 2). Internal choice is provided in the 2-mark sub-part of each case study.

36. **Fire-rescue ladder.** A fire engine has a turntable ladder whose foot is mounted on the truck 2 m above the ground. The fully extended ladder is 20 m long. (Take $\sqrt{3} = 1.73$, $\sqrt{2} = 1.41$.) **4**

i. The ladder is extended fully at 60° to the horizontal. How high above the ground does its top reach? *[1 mark]*

ii. In part (i), what is the horizontal distance between the foot of the ladder and the wall it touches? *[1 mark]*

iii. The truck stays in place (foot of ladder 10 m from the wall). To reach a window 12 m above the ground, find the angle of the ladder with the horizontal and the length of ladder needed. *[2 marks]*

OR

Keeping the full 20 m length, the angle is reduced from 60° to 30°. By how much does the height of the top of the ladder fall? *[2 marks]*

37. **Park pathway.** A rectangular park in Bhopal measures 30 m by 20 m. A paved path of uniform width x m is laid along the inside of its boundary, and the remaining lawn has an area of $336\ \text{m}^2$. **4**

i. Write the length and breadth of the lawn in terms of x. *[1 mark]*

ii. Form the quadratic equation in standard form satisfied by x. *[1 mark]*

iii. Solve the equation and find the width of the path, justifying your choice of root. *[2 marks]*

OR

With the width found, paving costs ₹150 per m². Find the cost of paving the path. *[2 marks]*

38. **Mela dice game.** At a Diwali mela stall, a player throws two fair dice together. The stall-keeper announces different prizes for different outcomes. **4**

i. Find the probability that the sum of the numbers is 7. *[1 mark]*

ii. Find the probability that the sum is at least 10. *[1 mark]*

iii. Find the probability that the two numbers differ by at least 3. *[2 marks]*

OR

Find the probability that the product of the two numbers is (a) odd, (b) even. *[2 marks]*