# CBSE Class 10 Mathematics · Sample Paper 4 (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.** Which of the following is a rational number? **1**

**(a)** $(3+\sqrt{2})^2$ **(b)** $(\sqrt{5}-\sqrt{3})(\sqrt{5}+\sqrt{3})$

**(c)** $\sqrt{2}\times\sqrt{8}\times\sqrt{3}$ **(d)** $\dfrac{1}{\sqrt{2}+1}$

**2.** If $\alpha, \beta$ are the zeroes of $x^2-3x+1$, a quadratic polynomial whose zeroes are $\alpha^2$ and $\beta^2$ is **1**

**(a)** $x^2-9x+1$ **(b)** $x^2-7x+1$

**(c)** $x^2+7x+1$ **(d)** $x^2-7x-1$

**3.** The graph of $y=ax^2+bx+c$ is a parabola opening downwards that cuts the $y$-axis above the origin. Then the zeroes of the polynomial **1**

**(a)** are both positive **(b)** are both negative

**(c)** have opposite signs **(d)** are not real

**4.** If $x=a,\ y=b$ is the solution of $x+y=5$ and $2x-3y=0$, then $a-b$ equals **1**

**(a)** $1$ **(b)** $-1$

**(c)** $5$ **(d)** $2$

**5.** The equation $x^2-2(k-1)x+(k+5)=0$ has equal roots when $k$ is **1**

**(a)** $4$ or $-1$ **(b)** $1$ or $-4$

**(c)** $4$ only **(d)** $-1$ only

**6.** If $a, b, c$ are in AP, then $(a-c)^2$ equals **1**

**(a)** $4(b^2-ac)$ **(b)** $4(ac-b^2)$

**(c)** $b^2-ac$ **(d)** $2(b^2-ac)$

**7.** The sum of all two-digit odd natural numbers is **1**

**(a)** $2425$ **(b)** $2475$

**(c)** $2500$ **(d)** $2530$

**8.** The point $P(k, 0)$ divides the join of $A(2, -2)$ and $B(-7, 4)$ internally in the ratio $1:2$. The value of $k$ is **1**

**(a)** $-1$ **(b)** $1$

**(c)** $-3$ **(d)** $2$

**9.** In $\triangle ABC$, $DE \parallel BC$ with $D$ on $AB$ and $E$ on $AC$. If $\frac{AD}{DB} = \frac{3}{5}$, then $\frac{DE}{BC}$ is **1**

**(a)** $\frac{3}{5}$ **(b)** $\frac{3}{8}$

**(c)** $\frac{5}{8}$ **(d)** $\frac{9}{64}$

**10.** The angle between two radii of a circle is $130^\circ$. The angle between the tangents drawn at the ends of these radii is **1**

**(a)** $40^\circ$ **(b)** $50^\circ$

**(c)** $65^\circ$ **(d)** $90^\circ$

**11.** $AB$ is a chord of a circle with centre $O$ and $\angle AOB = 100^\circ$. $AT$ is the tangent at $A$, on the side of $AB$ away from $O$. The angle $\angle BAT$ is **1**

**(a)** $40^\circ$ **(b)** $50^\circ$

**(c)** $80^\circ$ **(d)** $100^\circ$

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

**(a)** $0$ **(b)** $1$

**(c)** $\sec^2\theta$ **(d)** $\cos^2\theta$

**13.** The length of the shadow of a vertical tower on level ground is $\sqrt{3}$ times its height. The angle of elevation of the sun is **1**

**(a)** $30^\circ$ **(b)** $45^\circ$

**(c)** $60^\circ$ **(d)** $90^\circ$

**14.** A sector of angle $\theta$ of a circle of radius $2r$ has the same area as a sector of angle $60^\circ$ of a circle of radius $r$. Then $\theta$ is **1**

**(a)** $15^\circ$ **(b)** $30^\circ$

**(c)** $120^\circ$ **(d)** $240^\circ$

**15.** The total surface area of a solid hemisphere of radius $7$ cm is $\left(\pi = \frac{22}{7}\right)$ **1**

**(a)** $308\ \text{cm}^2$ **(b)** $462\ \text{cm}^2$

**(c)** $616\ \text{cm}^2$ **(d)** $154\ \text{cm}^2$

**16.** A solid consists of a cylinder of radius $3$ cm and height $5$ cm with a cone of the same radius and height $4$ cm on top. Its volume is **1**

**(a)** $45\pi \text{ cm}^3$ **(b)** $51\pi \text{ cm}^3$

**(c)** $57\pi \text{ cm}^3$ **(d)** $60\pi \text{ cm}^3$

**17.** For a grouped distribution with $N = 60$, the median class is $30$–$40$, its frequency is $12$ and the cumulative frequency of the class before it is $22$. The median is (approximately) **1**

**(a)** $32.5$ **(b)** $35$

**(c)** $36.67$ **(d)** $38.33$

**18.** Two fair coins are tossed together. The probability of getting at most one head is **1**

**(a)** $\dfrac{1}{4}$ **(b)** $\dfrac{1}{2}$

**(c)** $\dfrac{3}{4}$ **(d)** $1$

**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):** From a point outside a circle, exactly two tangents can be drawn to the circle.

**Reason (R):** A tangent to a circle meets it in exactly one point.

**(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 length of the arc of a sector of angle $60^\circ$ in a circle of radius $21$ cm is $22$ cm $\left(\pi = \dfrac{22}{7}\right)$.

**Reason (R):** The length of the arc of a sector of angle $\theta$ in a circle of radius $r$ is $\dfrac{\theta}{360^\circ} \times \pi r^2$.

**(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.** If $2^x \times 3^y \times 5^z = 10800$, find $x$, $y$, $z$. Hence find the HCF of $10800$ and $8100$. **2**

**22.** Find all values of $p$ for which the quadratic equation $2x^2 + px + 8 = 0$ has real roots. **2**

**OR**

Solve for $x$: $x^2 - (\sqrt{3}+1)x + \sqrt{3} = 0$.

**23.** Find the ratio in which the point $P(2, m)$ divides the line segment joining $A(-1, 7)$ and $B(4, -3)$. Hence find $m$. **2**

**24.** Find the acute angle $\theta$ for which $\sec^2\theta + \tan^2\theta = 7$. **2**

**OR**

For $A = 30^\circ$, verify that $\sin 3A = 3\sin A - 4\sin^3 A$.

**25.** A toy is a cone mounted on a hemisphere, both of radius $3$ cm. The total height of the toy is $10$ cm. Find the volume of the toy in terms of $\pi$. **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.** Let $p$ be a prime. Using the Fundamental Theorem of Arithmetic, show that if $p$ divides $a^2$ ($a$ a positive integer), then $p$ divides $a$. Hence prove that $\sqrt{7}$ is irrational. **3**

**27.** A jeweller in Jaipur has two gold alloys, one $60\%$ gold and the other $85\%$ gold by mass. How many grams of each must be melted together to obtain $50$ g of an alloy that is $70\%$ gold? **3**

**OR**

Find the sum of all natural numbers between $100$ and $300$ that are multiples of $7$ but not multiples of $3$.

**28.** Find the point $P$ on the line $y = 2x$ which is equidistant from $A(3, 1)$ and $B(-1, 5)$. Also find $PA$. **3**

**29.** $ABCD$ is a square of side $12$ cm. $E$ is a point on $BC$ with $BE = 8$ cm. $AE$ produced meets $DC$ produced at $F$. Prove that $\triangle ABE \sim \triangle FCE$ and find $CF$. **3**

**30.** $TP$ and $TQ$ are tangents from an external point $T$ to a circle with centre $O$ and radius $6$ cm, and $\angle PTQ = 90^\circ$. Prove that $OPTQ$ is a square, and find $OT$. **3**

**31.** If $\tan\theta + \cot\theta = \dfrac{4}{\sqrt{3}}$, find the values of $\tan^2\theta + \cot^2\theta$ and $\tan^3\theta + \cot^3\theta$. Hence find the possible acute angles $\theta$. **3**

**OR**

Prove that $(\sin A + \cos A)^2 = 1 + 2\sin A\cos A$. Hence, if $\sin A + \cos A = \dfrac{7}{5}$, find $\sin A\cos A$ and the possible values of $\sin A - \cos A$.

## 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.** A school bus travels $120$ km to a picnic spot. On the return journey along the same road its average speed is $10$ km/h less, and the round trip takes $4$ hours $24$ minutes of driving time. Find the average speed on the onward journey. Justify your choice of root. **5**

**OR**

Cans in a supermarket display are stacked in rows: the top row has $4$ cans and each row has $3$ more cans than the row above it. There are $246$ cans in all. (a) How many rows are there? (b) How many cans are in the bottom row? (c) How many cans are in the bottom five rows together?

**33.** In $\triangle ABC$, points $D$ and $E$ on $AB$ trisect it, with $AD = DE = EB$. Lines through $D$ and $E$ parallel to $BC$ meet $AC$ at $F$ and $G$ respectively. (a) Prove that $AF = FG = GC$. (b) If $BC = 18$ cm, find $DF$ and $EG$. (c) Find the ratio of the perimeters of $\triangle ADF$, $\triangle AEG$ and $\triangle ABC$. **5**

**34.** An escalator in a mall rises at $30^\circ$ to the horizontal from a point $B$ on the ground floor to a point $T$ on the first floor, $6$ m higher. Let $F$ be the point on the ground floor vertically below $T$. Standing at $T$, a shopper sees the foot $P$ of a pillar, which lies on the ground floor on segment $BF$, at an angle of depression of $60^\circ$. Find (a) the length of the escalator, (b) the horizontal distance $BF$, (c) the distance $FP$ and the distance $BP$. (Take $\sqrt{3} = 1.73$.) **5**

**35.** The ages of $80$ customers who visited a pharmacy in Guwahati one morning are given below. **5**

| **Age (years)** | 10–20 | 20–30 | 30–40 | 40–50 | 50–60 | 60–70 |
|---|---|---|---|---|---|---|
| **Customers** | 4 | 18 | 18 | 21 | 14 | 5 |

(a) Find the median age. (b) Find the modal age. (c) The mean age is $39.75$ years. Use the empirical relation to estimate the mode from the mean and median, and compare it with your answer to (b).

**OR**

Raffle tickets numbered $1$ to $120$ are sold at a school fair and one winning ticket is drawn at random. Find the probability that the winning number is (a) a multiple of $4$ or of $6$; (b) a multiple of neither $4$ nor $6$; (c) a perfect cube; (d) a number whose digits add up to $9$.

## 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.** **Community hall.** A village community hall is a cylinder of radius $7$ m and height $10$ m, topped by a hemispherical dome of the same radius. $\left(\pi = \dfrac{22}{7}\right)$ **4**

i. Find the curved surface area of the dome. *[1 mark]*

ii. Find the volume of air inside the hall. *[1 mark]*

iii. The inner curved wall and the inside of the dome are to be whitewashed at ₹15 per m². Find the cost. *[2 marks]*

**OR**

Safety norms require at least $11\ \text{m}^3$ of air per person. What is the greatest number of people the hall may hold? *[2 marks]*

**37.** **Theatre pricing.** A theatre in Chennai sells $300$ tickets a show at ₹200 each. A survey suggests that for every ₹10 cut in the price, $30$ more tickets would be sold. Let the price be cut by ₹$10x$. **4**

i. Find the revenue per show at the present price. *[1 mark]*

ii. Write the revenue $R$ as an expression in $x$. *[1 mark]*

iii. Find the ticket price(s) that would give a revenue of ₹64,800. *[2 marks]*

**OR**

Show that a revenue of ₹70,000 per show cannot be reached. *[2 marks]*

**38.** **Blood donation camp.** At a blood donation camp in Chandigarh, $150$ donors registered: $60$ of group O, $36$ of group A, $42$ of group B and $12$ of group AB. One registration card is picked at random. **4**

i. Find the probability that the donor is of group O. *[1 mark]*

ii. Find the probability that the donor is not of group AB. *[1 mark]*

iii. Later, $30$ more donors, all of group A, register. A card is now picked at random from all the cards. Find the probability that it belongs to group A. *[2 marks]*

**OR**

With the original $150$ donors, find the probability that the donor is (a) of group A or B, (b) of neither group O nor group B. *[2 marks]*