CBSE Class 10 Mathematics (Basic)

Practice Paper 2026-27 (Set 1)

Subject: Mathematics Basic | **Subject Code:** 241 | **Class:** X
Time Allowed: 3 Hours | **Maximum Marks:** 80

Prepared by Sunbeam World School for practice. This is an original practice paper written on the CBSE Class X question paper design for 2026-27. It is not a CBSE board paper and not a CBSE sample question paper. Official past board papers are published on cbse.gov.in and the official sample question paper is on cbseacademic.nic.in.

Note on level. Mathematics Basic (241) and Mathematics Standard (041) cover the same syllabus, but Basic is set at a lower level of difficulty. Use this paper only if the student is registered for Basic.

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** has 20 questions of 1 mark each, including two Assertion and Reason questions.
4. **Section B** has 5 questions of 2 marks each.
5. **Section C** has 6 questions of 3 marks each.
6. **Section D** has 4 questions of 5 marks each.
7. **Section E** has 3 case-based questions of 4 marks each.
8. Internal choice is provided in some questions of Sections B, C, D and in all of Section E.
9. Draw neat figures wherever required. Take **π = 22/7** unless stated otherwise.
10. Use of a calculator is **not** permitted.

Blueprint: Unit-Wise Distribution

Unit	Unit Name	Marks
I	Number Systems	6
II	Algebra	20
III	Coordinate Geometry	6
IV	Geometry	15
V	Trigonometry	12
VI	Mensuration	10
VII	Statistics and Probability	11
	Total	**80**

SECTION A

20 questions of 1 mark each

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

2. The LCM of 4 and 6 is
(a) 2 (b) 10 (c) 12 (d) 24

3. Which of the following is an irrational number?
(a) √2 (b) 0.5 (c) 3/4 (d) √16

4. The zeroes of the polynomial $x^2 - 5x + 6$ are
(a) 1 and 6 (b) 2 and 3 (c) −2 and −3 (d) 5 and 6

5. The sum of the zeroes of the polynomial $x^2 - 3x + 2$ is
(a) 2 (b) 3 (c) −3 (d) 1

6. If $x + y = 5$ and $x - y = 1$, then the value of x is
(a) 2 (b) 3 (c) 4 (d) 5

7. The roots of the equation $x^2 - 4 = 0$ are
(a) 2 and 4 (b) 2 and −2 (c) 0 and 4 (d) −4 and 4

8. The 5th term of the AP 2, 5, 8, ... is
(a) 11 (b) 14 (c) 15 (d) 17

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

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

11. The mid-point of the line segment joining (2, 3) and (4, 7) is
(a) (3, 5) (b) (6, 10) (c) (2, 4) (d) (1, 2)

12. If $\triangle ABC \sim \triangle PQR$ with AB : PQ = 2 : 3, then ar($\triangle ABC$) : ar($\triangle PQR$) is
(a) 2 : 3 (b) 3 : 2 (c) 4 : 9 (d) 9 : 4

13. In $\triangle ABC$, DE ∥ BC with D on AB and E on AC. If AD = 1 cm, DB = 2 cm and AE = 2 cm, then EC equals
(a) 2 cm (b) 3 cm (c) 4 cm (d) 6 cm

14. The length of the tangent from a point 5 cm from the centre of a circle of radius 3 cm is
(a) 2 cm (b) 4 cm (c) 6 cm (d) 8 cm

15. The number of tangents that can be drawn to a circle from a point outside it is
(a) 0 (b) 1 (c) 2 (d) 3

16. The angle between a radius and the tangent at the point of contact is
(a) 45° (b) 60° (c) 90° (d) 180°

17. The value of sin 45° is
(a) 1/2 (b) 1/√2 (c) √3/2 (d) 1

18. The value of tan 45° + cot 45° is
(a) 0 (b) 1 (c) 2 (d) √2

19. Assertion and Reason.
Assertion (A): The probability of getting an even number when a fair die is rolled once is 1/2.
Reason (R): The even numbers on a die are 2, 4 and 6.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

20. Assertion and Reason.
Assertion (A): The mean of 2, 4, 6 and 8 is 5.
Reason (R): The mean of a set of observations is the sum of the observations divided by their number.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

SECTION B

5 questions of 2 marks each

21. Solve the pair of linear equations x + y = 6 and x − y = 2.

22. In $\triangle ABC$, DE ∥ BC with D on AB and E on AC. If AD = 3 cm, AB = 9 cm and AC = 18 cm, find AE.

OR

In $\triangle ABC$, DE ∥ BC with AD = 2 cm, DB = 4 cm and EC = 8 cm. Find AE.

23. Evaluate: sin 30° × cos 60° + cos 30° × sin 60°

24. Find the area of a circle of radius 7 cm. (Take π = 22/7)

OR

Find the circumference of a circle of radius 14 cm. (Take π = 22/7)

25. A bag contains 4 red balls and 6 white balls. One ball is drawn at random. Find the probability that it is white.

SECTION C

6 questions of 3 marks each

26. Prove that √2 is irrational.

27. Find the zeroes of the polynomial $x^2 - 2x - 8$ and verify the relationship between the zeroes and the coefficients.

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

OR

Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

29. Prove that sin A × cosec A + cos A × sec A = 2.

30. Find the volume of a cylinder of radius 7 cm and height 10 cm. (Take π = 22/7)

OR

Find the curved surface area of a cylinder of radius 7 cm and height 20 cm. (Take π = 22/7)

31. Find the mean of the following distribution.

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	5	8	12	10	5

SECTION D

4 questions of 5 marks each

32. The sum of two numbers is 27 and their product is 182. Find the numbers.

OR

Solve the quadratic equation $x^2 - 7x + 12 = 0$ by factorisation and verify the roots.

33. State and prove the Basic Proportionality Theorem (Thales' theorem).

34. A pole stands vertically on level ground. From a point 30 m away from its foot, the angle of elevation of the top of the pole is 30°. Find the height of the pole. (Take $\sqrt{3} = 1.73$)

35. A cone has radius 7 cm and height 24 cm. Find its curved surface area. (Take $\pi = 22/7$)

OR

Find the total surface area of a cube of edge 10 cm, and the volume of a cuboid of dimensions 10 cm by 8 cm by 5 cm.

SECTION E

3 case-based questions of 4 marks each

36. Case Study: A Starting Salary

Arun joins a company at a monthly salary of ₹12,000. His salary increases by ₹500 every year, so his yearly salaries form an arithmetic progression.

(i) What is his monthly salary in the 8th year? **(1)**
(ii) In which year does his monthly salary first reach ₹16,000? **(1)**
(iii) Find the sum of his monthly salary figures over the first 10 years. **(2)**

OR

(iii) By how much has his monthly salary increased in total after 15 years of service? **(2)**

37. Case Study: A Triangular Plot

A triangular plot is drawn on a coordinate grid where each unit is one metre. Its corners are at A(0, 0), B(6, 0) and C(6, 8).

(i) Find the length of side AB. **(1)**
(ii) Find the length of side AC. **(1)**
(iii) Find the coordinates of the mid-point of AC. **(2)**

OR

(iii) Find the length of side BC and state the type of triangle ABC is. **(2)**

38. Case Study: Rolling a Die

A fair six-sided die, with faces numbered 1 to 6, is rolled once.

(i) Find the probability of getting an even number. **(1)**
(ii) Find the probability of getting a number greater than 4. **(1)**
(iii) Find the probability of not getting a 3. **(2)**

OR

(iii) Find the probability of getting a number that is a multiple of 3. **(2)**

MARKING SCHEME

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Marks are shown in brackets. Award full marks for any other correct method.

SECTION A (20 × 1 = 20)

Q	Answer	Marks
1	(c) 6	1
2	(c) 12	1
3	(a) √2	1
4	(b) 2 and 3	1
5	(b) 3	1
6	(b) 3	1
7	(b) 2 and −2	1
8	(b) 14	1
9	(b) 4	1
10	(c) 5 units	1
11	(a) (3, 5)	1
12	(c) 4 : 9	1
13	(c) 4 cm	1
14	(b) 4 cm	1
15	(c) 2	1
16	(c) 90°	1
17	(b) 1/√2	1
18	(c) 2	1
19	(a) Both A and R are true and R is the correct explanation of A	1
20	(a) Both A and R are true and R is the correct explanation of A	1

Working notes for Section A

- Q6: Adding the equations gives $2x = 6$, so $x = 3$.
- Q8: $a_5 = 2 + 4(3) = 14$.
- Q10: $\sqrt{(3^2 + 4^2)} = \sqrt{25} = 5$.
- Q12: Ratio of areas = square of ratio of sides = $(2/3)^2 = 4/9$.
- Q13: AD/DB = AE/EC gives $1/2 = 2/EC$, so EC = 4 cm.
- Q14: $\sqrt{(5^2 - 3^2)} = \sqrt{16} = 4$ cm.
- Q20: Mean = $(2 + 4 + 6 + 8)/4 = 20/4 = 5$.

SECTION B (5 × 2 = 10)

21. Adding the equations: $2x = 8$, so $x = 4$ **(1)**
Substituting: $4 + y = 6$, so $y = 2$. Answer $x = 4$, $y = 2$ **(1)**

22. AD/AB = AE/AC **(1)**
3/9 = AE/18, so AE = 6 cm **(1)**

OR

AD/DB = AE/EC gives 2/4 = AE/8 **(1)**
AE = 4 cm **(1)**

23. $\sin 30° \times \cos 60° = (1/2)(1/2) = 1/4$ **(1)**
$\cos 30° \times \sin 60° = (\sqrt{3}/2)(\sqrt{3}/2) = 3/4$, so the value is $1/4 + 3/4 = 1$ **(1)**

24. Area = $\pi r^2 = (22/7) \times 7 \times 7$ **(1)** = 154 cm² **(1)**

OR

Circumference = $2\pi r = 2 \times (22/7) \times 14$ **(1)** = 88 cm **(1)**

25. Total balls = 4 + 6 = 10 **(1)**
P(white) = 6/10 = 3/5 **(1)**

SECTION C (6 × 3 = 18)

26. Let √2 be rational, so $\sqrt{2} = p/q$ with p and q coprime and $q \neq 0$ **(1)**
Then $2q^2 = p^2$, so 2 divides p. Let $p = 2m$, giving $2q^2 = 4m^2$, so $q^2 = 2m^2$ **(1)**
Then 2 divides q as well, contradicting that p and q are coprime. Hence √2 is irrational **(1)**

27. $x^2 - 2x - 8 = x^2 - 4x + 2x - 8 = x(x - 4) + 2(x - 4) = (x - 4)(x + 2)$ **(1)**
Zeroes are $x = 4$ and $x = -2$ **(1)**
Sum = $4 + (-2) = 2 = -b/a$, and product = $4 \times (-2) = -8 = c/a$. Verified **(1)**

28. Correct figure: circle with centre O, external point P, tangents PA and PB **(1)**
In △OAP and △OBP: OA = OB (radii), OP common, ∠OAP = ∠OBP = 90° **(1)**
△OAP ≅ △OBP by RHS, hence PA = PB by CPCT **(1)**

OR

Correct figure with centre O, tangent XY touching at P **(1)**
Take any point Q on XY other than P. Q lies outside the circle, so OQ > OP **(1)**
OP is therefore the shortest distance from O to XY, and the shortest distance is the perpendicular, so OP ⊥ XY **(1)**

29. sin A × cosec A = sin A × (1/sin A) = 1 **(1)**
cos A × sec A = cos A × (1/cos A) = 1 **(1)**
Sum = 1 + 1 = 2 **(1)**

30. Volume of cylinder = $\pi r^2 h$ = (22/7) × 49 × 10 **(1)(1)**
= 1540 cm³ **(1)**

OR

CSA = $2\pi rh$ = 2 × (22/7) × 7 × 20 **(1)(1)** = 880 cm² **(1)**

31.

Class	**Frequency f_i**	**Mid-point x_i**	**$f_i x_i$**
0-10	5	5	25
10-20	8	15	120
20-30	12	25	300
30-40	10	35	350
40-50	5	45	225
Total	**40**		**1020**

Correct table with mid-points **(1)**, $\Sigma f_i x_i = 1020$ and $\Sigma f_i = 40$ **(1)**
Mean = 1020/40 = **25.5 (1)**

SECTION D (4 × 5 = 20)

32. Let the numbers be x and 27 − x **(1)**
x(27 − x) = 182, so 27x − x² = 182 **(1)**
x² − 27x + 182 = 0 **(1)**
(x − 13)(x − 14) = 0 **(1)**
x = 13 or x = 14, so the numbers are **13 and 14 (1)**

OR

x² − 7x + 12 = x² − 3x − 4x + 12 **(1)**
= x(x − 3) − 4(x − 3) = (x − 3)(x − 4) **(2)**
Roots are x = 3 and x = 4 **(1)**
Check: 3 + 4 = 7 = −b/a and 3 × 4 = 12 = c/a. Verified **(1)**

33. Statement: if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio **(1)**
Correct figure with △ABC and DE ∥ BC **(1)**
ar(△ADE)/ar(△BDE) = AD/DB, since the two triangles have the same height from E **(1)**
ar(△ADE)/ar(△DEC) = AE/EC, by the same argument from D **(1)**
△BDE and △DEC lie on the same base DE and between the same parallels, so their areas are equal, giving AD/DB = AE/EC **(1)**

34. Correct figure with pole AB, point C on the ground, BC = 30 m, ∠ACB = 30° **(1)**
tan 30° = AB/BC **(1)**
1/√3 = AB/30 **(1)**
AB = 30/√3 = 10√3 **(1)**
= 10 × 1.73 = **17.3 m (1)**

35. Slant height l = √(7² + 24²) = √(49 + 576) = √625 = 25 cm **(2)**
CSA of cone = πrl = (22/7) × 7 × 25 **(2)**
= **550 cm² (1)**

OR

TSA of cube = 6a² = 6 × 100 = **600 cm² (2)(1)**
Volume of cuboid = 10 × 8 × 5 = **400 cm³ (2)**

SECTION E (3 × 4 = 12)

36. a = 12000, d = 500
(i) a_8 = 12000 + 7(500) = **₹15,500 (1)**
(ii) 12000 + (n − 1)500 = 16000 gives n − 1 = 8, so n = **9th year (1)**
(iii) S_{10} = (10/2)[2(12000) + 9(500)] = 5(24000 + 4500) = 5 × 28500 = **₹1,42,500 (2)**
OR (iii) Increase after 15 years = 14 × 500 = **₹7,000 (2)**

37. (i) AB = 6 − 0 = **6 m (1)**
(ii) AC = √((6 − 0)² + (8 − 0)²) = √(36 + 64) = √100 = **10 m (1)**
(iii) Mid-point of AC = ((0 + 6)/2, (0 + 8)/2) = **(3, 4) (2)**
OR (iii) BC = √((6 − 6)² + (8 − 0)²) = 8 m. Since AB = 6, BC = 8 and AC = 10, and 6² + 8² = 10², triangle ABC is **right-angled at B (2)**

38. (i) Even numbers are 2, 4, 6, so P = 3/6 = **1/2 (1)**
(ii) Numbers greater than 4 are 5 and 6, so P = 2/6 = **1/3 (1)**
(iii) P(not 3) = 1 − P(3) = 1 − 1/6 = **5/6 (2)**
OR (iii) Multiples of 3 are 3 and 6, so P = 2/6 = **1/3 (2)**

End of marking scheme.