CBSE Class 10 Mathematics (Standard)

Practice Paper 2026-27 (Set 1)

Subject: Mathematics Standard | **Subject Code:** 041 | **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.

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, with internal choice in the 2-mark part.
8. Internal choice is provided in 2 questions of Section B, 2 of Section C, 2 of Section D and 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 LCM of 18 and 24 is
(a) 36 (b) 54 (c) 72 (d) 144

2. If HCF(a, b) = 12 and a × b = 1800, then LCM(a, b) is
(a) 120 (b) 150 (c) 180 (d) 200

3. Which of the following is an irrational number?
(a) √36 (b) √45 (c) 0.75 (d) 22/7

4. The zeroes of the polynomial $x^2 - 7x + 12$ are
(a) 3 and 4 (b) −3 and −4 (c) 2 and 6 (d) 1 and 12

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

6. The pair of equations x + 2y = 5 and 3x + 6y = 15 has
(a) a unique solution (b) no solution (c) infinitely many solutions (d) exactly two solutions

7. The discriminant of the quadratic equation $2x^2 - 4x + 3 = 0$ is
(a) −8 (b) 8 (c) 40 (d) −40

8. The 11th term of the AP 3, 7, 11, ... is
(a) 39 (b) 43 (c) 47 (d) 40

9. If the nth term of an AP is given by $a_n = 3n + 2$, then its common difference is
(a) 2 (b) 3 (c) 5 (d) 8

10. The distance between the points (0, 0) and (6, 8) is
(a) 7 units (b) 10 units (c) 14 units (d) 48 units

11. The mid-point of the line segment joining (−2, 4) and (6, 8) is
(a) (2, 6) (b) (4, 12) (c) (2, 12) (d) (4, 6)

12. If $\triangle ABC \sim \triangle DEF$ with $AB : DE = 3 : 5$ and $ar(\triangle ABC) = 18\ cm^2$, then $ar(\triangle DEF)$ is
(a) $30\ cm^2$ (b) $45\ cm^2$ (c) $50\ cm^2$ (d) $60\ cm^2$

13. In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $AD = 2$ cm, $DB = 3$ cm and $AE = 4$ cm, then EC equals
(a) 4 cm (b) 5 cm (c) 6 cm (d) 8 cm

14. The length of the tangent drawn from a point 13 cm from the centre of a circle of radius 5 cm is
(a) 8 cm (b) 12 cm (c) 18 cm (d) 144 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) infinitely many

16. Two tangents are drawn from an external point P to a circle with centre O. If $\angle AOB = 110°$, where A and B are the points of contact, then $\angle APB$ equals
(a) 55° (b) 70° (c) 90° (d) 110°

17. The value of $\sin 30° + \cos 60°$ is
(a) 1/2 (b) 1 (c) $\sqrt{3}/2$ (d) 0

18. If $\tan \theta = 3/4$, then $\sin \theta$ equals
(a) 3/5 (b) 4/5 (c) 5/3 (d) 4/3

19. Assertion and Reason.
Assertion (A): The probability of getting a prime number when a fair die is rolled once is 1/2.
Reason (R): The prime numbers on a die are 2, 3 and 5.
(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 mode of the data 2, 3, 3, 4, 5, 3, 6 is 3.
Reason (R): The mode of a set of observations is the observation that occurs most frequently.
(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 $2x + y = 7$ and $x - y = 2$.

22. In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $AD = 4$ cm, $DB = 6$ cm and $AC = 20$ cm, find AE.

OR

In $\triangle ABC$, D and E are points on AB and AC such that $AD = 3$ cm, $AB = 9$ cm, $AE = 4$ cm and $AC = 12$ cm. Show that $DE \parallel BC$.

23. Evaluate: $2\tan^2 45° + \cos^2 30° - \sin^2 60°$

24. Find the area of a sector of a circle of radius 7 cm with central angle 60°.

OR

Find the length of the arc of a circle of radius 21 cm which subtends an angle of 60° at the centre.

25. A bag contains 5 red balls and 3 blue balls. One ball is drawn at random. Find the probability that it is red.

SECTION C

6 questions of 3 marks each

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

27. Find the zeroes of the polynomial $6x^2 - 7x - 3$ 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 parallelogram circumscribing a circle is a rhombus.

29. Prove that $(1 + \tan^2 A) / (1 + \cot^2 A) = \tan^2 A$.

30. A cone has radius 6 cm and height 8 cm. Find its total surface area. (Take $\pi = 22/7$)

OR

Find the volume of a sphere of radius 7 cm. (Take $\pi = 22/7$)

31. Find the mean of the following distribution.

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	4	6	10	12	8

SECTION D

4 questions of 5 marks each

32. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

OR

The sum of the squares of two consecutive positive integers is 365. Find the integers.

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

34. From the top of a building 7 m high, 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. (Take $\sqrt{3} = 1.73$)

35. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel. (Take $\pi = 22/7$)

OR

A solid is in the shape of a cone of radius 6 cm standing on a hemisphere of the same radius. If the height of the cone is 8 cm, find the total surface area of the solid. (Take $\pi = 22/7$)

SECTION E

3 case-based questions of 4 marks each

36. Case Study: A Monthly Savings Plan

Rhea decides to save money every month. She saves ₹500 in the first month and increases her saving by ₹100 every month after that, so her monthly savings form an arithmetic progression.

(i) How much does she save in the 10th month? **(1)**
(ii) In which month does her monthly saving first reach ₹2000? **(1)**
(iii) Find the total amount she saves in the first 12 months. **(2)**

OR

(iii) Find the total amount she saves in the first 20 months. **(2)**

37. Case Study: Laying Out a Park

A rectangular park is drawn on a coordinate grid where each unit represents one metre. Its four corners are at A(1, 2), B(9, 2), C(9, 8) and D(1, 8).

(i) Find the length of side AB. **(1)**
(ii) Find the coordinates of the centre of the park. **(1)**
(iii) Find the length of the diagonal AC. **(2)**

OR

(iii) A bench is to be placed on AB at the point dividing AB in the ratio 1 : 3 from A. Find its coordinates. **(2)**

38. Case Study: A Game of Cards

One card is drawn at random from a well-shuffled deck of 52 playing cards.

(i) Find the probability that the card drawn is a king. **(1)**
(ii) Find the probability that the card drawn is a red face card. **(1)**
(iii) Find the probability that the card drawn is neither a heart nor a king. **(2)**

OR

(iii) Find the probability that the card drawn is a spade or an ace. **(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) 72	1
2	(b) 150	1
3	(b) √45	1
4	(a) 3 and 4	1
5	(a) 5/2	1
6	(c) infinitely many solutions	1
7	(a) −8	1
8	(b) 43	1
9	(b) 3	1
10	(b) 10 units	1
11	(a) (2, 6)	1
12	(c) 50 cm²	1
13	(c) 6 cm	1
14	(b) 12 cm	1
15	(c) 2	1
16	(b) 70°	1
17	(b) 1	1
18	(a) 3/5	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

- Q1: $18 = 2 \times 3^2$, $24 = 2^3 \times 3$, so LCM $= 2^3 \times 3^2 = 72$.
- Q2: LCM $= (a \times b) / \text{HCF} = 1800 / 12 = 150$.
- Q5: Sum of zeroes $= -b/a = 5/2$.
- Q6: $1/3 = 2/6 = 5/15$, so the lines coincide and there are infinitely many solutions.
- Q7: $D = b^2 - 4ac = 16 - 24 = -8$.
- Q8: $a_{11} = 3 + 10(4) = 43$.
- Q10: $\sqrt{(6^2 + 8^2)} = \sqrt{100} = 10$.
- Q12: Ratio of areas $= (3/5)^2 = 9/25$, so ar(DEF) $= 18 \times 25/9 = 50$ cm².
- Q13: AD/DB = AE/EC gives $2/3 = 4/EC$, so EC = 6 cm.
- Q14: $\sqrt{(13^2 - 5^2)} = \sqrt{144} = 12$ cm.
- Q16: $\angle APB = 180° - 110° = 70°$.
- Q18: $\tan\theta = 3/4$ gives a 3, 4, 5 triangle, so $\sin\theta = 3/5$.

SECTION B (5 × 2 = 10)

21. Adding the two equations: $3x = 9$, so $x = 3$ **(1)**
Substituting: $3 - y = 2$, so $y = 1$. Answer $x = 3$, $y = 1$ **(1)**

22. AD/AB = AE/AC, where AB = AD + DB = 10 cm **(1)**
4/10 = AE/20, so AE = 8 cm **(1)**

OR

AD/AB = 3/9 = 1/3 and AE/AC = 4/12 = 1/3 **(1)**
Since AD/AB = AE/AC, by the converse of the Basic Proportionality Theorem DE ∥ BC **(1)**

23. $2\tan^2 45° = 2(1)^2 = 2$ **(1)**
$\cos^2 30° - \sin^2 60° = (\sqrt{3}/2)^2 - (\sqrt{3}/2)^2 = 0$, so the value is 2 **(1)**

24. Area of sector $= (\theta/360°) \times \pi r^2 = (60/360) \times (22/7) \times 49$ **(1)**
$= (1/6) \times 154 = 77/3$ cm², approximately 25.67 cm² **(1)**

OR

Arc length $= (\theta/360°) \times 2\pi r = (60/360) \times 2 \times (22/7) \times 21$ **(1)**
$= (1/6) \times 132 = 22$ cm **(1)**

25. Total balls = 5 + 3 = 8 **(1)**
P(red) = 5/8 **(1)**

SECTION C (6 × 3 = 18)

26. Let $\sqrt{5}$ be rational, so $\sqrt{5} = p/q$ where p and q are coprime integers and $q \neq 0$ **(1)**
Then $5q^2 = p^2$, so 5 divides p^2, hence 5 divides p. Let $p = 5m$, giving $5q^2 = 25m^2$, so $q^2 = 5m^2$ **(1)**
Then 5 divides q as well, contradicting that p and q are coprime. Hence $\sqrt{5}$ is irrational **(1)**

27. $6x^2 - 7x - 3 = 6x^2 - 9x + 2x - 3 = 3x(2x - 3) + 1(2x - 3) = (3x + 1)(2x - 3)$ **(1)**
Zeroes are $x = -1/3$ and $x = 3/2$ **(1)**
Sum $= 3/2 - 1/3 = 7/6 = -b/a$, and product $= -1/2 = c/a = -3/6$. 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, $\angle OAP = \angle OBP = 90°$ **(1)**
△OAP ≅ △OBP by RHS, hence PA = PB by CPCT **(1)**

OR

ABCD is a parallelogram circumscribing a circle. Using equal tangents from each vertex, AP = AS, BP = BQ, CR = CQ, DR = DS **(1)**
Adding: AB + CD = AD + BC **(1)**
Since AB = CD and AD = BC in a parallelogram, 2AB = 2BC, so AB = BC and ABCD is a rhombus **(1)**

29. LHS $= (1 + \tan^2 A)/(1 + \cot^2 A) = \sec^2 A / \operatorname{cosec}^2 A$ **(1)**
$= (1/\cos^2 A) \times (\sin^2 A/1)$ **(1)**
$= \sin^2 A/\cos^2 A = \tan^2 A =$ RHS **(1)**

30. Slant height $l = \sqrt{(6^2 + 8^2)} = \sqrt{100} = 10$ cm **(1)**
TSA $= \pi r(l + r) = (22/7) \times 6 \times (10 + 6)$ **(1)**
$= (22/7) \times 96 = 2112/7 \approx 301.71$ cm² **(1)**

OR

Volume of sphere $= (4/3)\pi r^3 = (4/3) \times (22/7) \times 343$ **(1)(1)**
$= 4312/3 \approx 1437.33$ cm³ **(1)**

31.

Class	**Frequency f_i**	**Mid-point x_i**	**$f_i x_i$**
0-10	4	5	20
10-20	6	15	90
20-30	10	25	250
30-40	12	35	420
40-50	8	45	360
Total	**40**		**1140**

Correct table with mid-points **(1)**, $\Sigma f_i x_i = 1140$ and $\Sigma f_i = 40$ **(1)**
Mean $= 1140/40 =$ **28.5 (1)**

SECTION D (4 × 5 = 20)

32. Let the speed be x km/h. Then $360/x - 360/(x + 5) = 1$ **(1)**
$360(x + 5) - 360x = x(x + 5)$, so $1800 = x^2 + 5x$ **(1)**
$x^2 + 5x - 1800 = 0$ **(1)**
$x = (-5 \pm \sqrt{(25 + 7200)})/2 = (-5 \pm 85)/2$ **(1)**
$x = 40$, rejecting the negative root. Speed = **40 km/h (1)**

OR

Let the integers be x and x + 1. Then $x^2 + (x + 1)^2 = 365$ **(1)**
$2x^2 + 2x + 1 = 365$, so $2x^2 + 2x - 364 = 0$ **(1)**
$x^2 + x - 182 = 0$ **(1)**
$(x + 14)(x - 13) = 0$, so $x = 13$, rejecting $x = -14$ as the integers are positive **(1)**
The integers are **13 and 14 (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, DE ∥ BC, and perpendiculars DN ⊥ AE, EM ⊥ AD **(1)**
ar(△ADE)/ar(△BDE) = AD/DB, since the triangles share the same height from E **(1)**
ar(△ADE)/ar(△DEC) = AE/EC, by the same argument from D **(1)**
△BDE and △DEC are 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 building AB = 7 m, tower CD, horizontal BD **(1)**
From the angle of depression of 45°, the horizontal distance = height of building = 7 m **(1)**
Let the part of the tower above the building be h. Then $\tan 60° = h/7$, so $h = 7\sqrt{3}$ **(1)**
Height of tower $= 7 + 7\sqrt{3}$ **(1)**
$= 7(1 + 1.73) = 7 \times 2.73 =$ **19.11 m** (accept 19.1 m or 19.12 m) **(1)**

35. Radius $r = 14/2 = 7$ cm **(1)**
Height of the cylindrical part $= 13 - 7 = 6$ cm **(1)**
Inner surface area = curved surface of hemisphere + curved surface of cylinder $= 2\pi r^2 + 2\pi rh$ **(1)**

= 2 × (22/7) × 7 × (7 + 6) **(1)**
= 44 × 13 = **572 cm² (1)**

OR

Slant height of cone l = √(6² + 8²) = 10 cm **(1)**
TSA = curved surface of cone + curved surface of hemisphere = πrl + 2πr² **(1)**
= (22/7) × 6 × 10 + 2 × (22/7) × 36 **(1)**
= 1320/7 + 1584/7 = 2904/7 **(1)**
≈ **414.86 cm² (1)**

SECTION E (3 × 4 = 12)

36. a = 500, d = 100
(i) a_{10} = 500 + 9(100) = **₹1400 (1)**
(ii) 500 + (n − 1)100 = 2000 gives n − 1 = 15, so n = **16th month (1)**
(iii) S_{12} = (12/2)[2(500) + 11(100)] = 6(1000 + 1100) = 6 × 2100 = **₹12,600 (2)**
OR (iii) S_{20} = (20/2)[2(500) + 19(100)] = 10(1000 + 1900) = **₹29,000 (2)**

37. (i) AB = 9 − 1 = **8 m (1)**
(ii) Centre = mid-point of AC = ((1 + 9)/2, (2 + 8)/2) = **(5, 5) (1)**
(iii) AC = √((9 − 1)² + (8 − 2)²) = √(64 + 36) = √100 = **10 m (2)**
OR (iii) Using the section formula with ratio 1 : 3, x = (1 × 9 + 3 × 1)/4 = 12/4 = 3, y = 2. Coordinates **(3, 2) (2)**

38. (i) P(king) = 4/52 = **1/13 (1)**
(ii) Red face cards are the king, queen and jack of hearts and of diamonds, so 6 cards. P = 6/52 = **3/26 (1)**
(iii) Hearts = 13, kings outside hearts = 3, so favourable = 52 − 16 = 36. P = 36/52 = **9/13 (2)**
OR (iii) Spades = 13, aces outside spades = 3, so favourable = 16. P = 16/52 = **4/13 (2)**

End of marking scheme.