CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Mathematics (Standard)

Subject Code: 041 | Class X

Solutions

Sample Question Paper – Set 1

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

General Instructions

1. This question paper contains 38 questions. All questions are compulsory.
2. The question paper is divided into five Sections – A, B, C, D and E.
3. Section A comprises 18 Multiple Choice Questions (MCQs) of 1 mark each and Question Numbers 19 and 20 are Assertion–Reason based questions of 1 mark each.
4. Section B comprises 5 Very Short Answer (VSA) type questions of 2 marks each (Q.21–25).
5. Section C comprises 6 Short Answer (SA) type questions of 3 marks each (Q.26–31).
6. Section D comprises 4 Long Answer (LA) type questions of 5 marks each (Q.32–35).
7. Section E comprises 3 Case-Study based questions of 4 marks each (Q.36–38), with an internal choice in the 2-mark sub-part of each case study.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C and 2 questions in Section D, and in the 2-mark sub-part of each question in Section E.
9. Use of calculators is not permitted.
10. Draw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.

Exam Pattern

Section	Type of Questions	No. of Qs	Marks each	Total Marks
A	Multiple Choice Questions & Assertion–Reason	20	1	20
B	Very Short Answer (VSA)	5	2	10
C	Short Answer (SA)	6	3	18
D	Long Answer (LA)	4	5	20
E	Case-Study Based	3	4	12
	Total	**38**		**80**

Unit-wise Weightage of Marks

Unit	Unit Name	Chapter	Marks
I	Number Systems	Real Numbers	6
II	Algebra	Polynomials; Pair of Linear Equations in Two Variables; Quadratic Equations; Arithmetic Progressions	20
III	Coordinate Geometry	Coordinate Geometry	6
IV	Geometry	Triangles; Circles	15
V	Trigonometry	Introduction to Trigonometry; Some Applications of Trigonometry	12

Unit	Unit Name	Chapter	Marks
VI	Mensuration	Areas Related to Circles; Surface Areas and Volumes	10
VII	Statistics & Probability	Statistics; Probability	11
	Total		**80**

SECTION – A

Section A consists of 20 questions of 1 mark each.

Q1. The greatest number which divides both 134 and 188, leaving remainders 4 and 6 respectively, is: **[1]**

(a) 13 (b) 26 (c) 39 (d) 65

Q2. The value of k for which the pair of linear equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ has infinitely many solutions is: **[1]**

(a) -2 (b) 2 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

Q3. In what ratio does the x-axis divide the line segment joining the points $A(3, 6)$ and $B(-12, -3)$? **[1]**

(a) $1 : 2$ (b) $1 : 4$ (c) $4 : 1$ (d) $2 : 1$

Q4. Tangents PA and PB are drawn from an external point P to a circle with centre O, touching it at A and B. If $\angle AOB = 130^\circ$, then $\angle APB$ is equal to: **[1]**

(a) 130° (b) 50° (c) 120° (d) 90°

Q5. If $\tan\theta = \dfrac{5}{2}$, then $\dfrac{4\sin\theta + \cos\theta}{4\sin\theta - \cos\theta}$ is equal to **[1]**

(a) $\frac{11}{9}$ (b) $\frac{3}{2}$ (c) $\frac{9}{11}$ (d) 4

Q6. The total surface area of a solid hemisphere of diameter $2d$ is: **[1]**

(a) $3\pi d^2$ (b) $2\pi d^2$ (c) $\frac{1}{2}\pi d^2$ (d) $\frac{3}{4}\pi d^2$

Q7. The mean and median of the data are 35.5 and 32 respectively. The value of the mode of the data is: **[1]**

(a) 23 (b) 26 (c) 25 (d) 30

Q8. If the nth term of an A.P. is $7n - 4$, then the common difference of the A.P. is **[1]**

(a) 7 (b) $7n$ (c) -4 (d) 4

Q9. The perimeters of two similar triangles are 56 cm and 70 cm. If one side of the first triangle is 14 cm, then the corresponding side of the second triangle, in cm, is **[1]**

(a) 5 (b) 7.5 (c) 10 (d) 17.5

Q10. A pole 6 m high casts a shadow $2\sqrt{3}$ m long on the ground. The elevation of the Sun is: **[1]**

(a) 60° (b) 45° (c) 30° (d) 90°

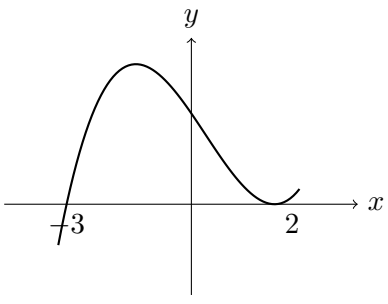
Q11. The diameter of a car wheel is 21 cm. The number of complete revolutions it will make in moving 66 km is: **[1]**

(a) 10^4 (b) 10^5 (c) 10^6 (d) 10^7

Q12. Two fair coins are tossed simultaneously. The probability of getting at most one head is: **[1]**

(a) $\frac{3}{4}$ (b) $\frac{1}{4}$ (c) $\frac{1}{2}$ (d) $\frac{3}{8}$

Q13. The graph of $y = p(x)$ for a polynomial $p(x)$ is shown. The number of distinct zeroes of $p(x)$ is:



[1]

(a) 0 (b) 1 (c) 2 (d) 3

Q14. PA is a tangent from an external point P to a circle with centre O, touching it at A. The points A, O, B lie on one straight line (AB is a diameter), and $\angle POB = 125°$. Then $\angle APO$ is equal to: **[1]**

(a) $25°$ (b) $65°$ (c) $90°$ (d) $35°$

Q15. The value of $\cot^2\theta - \dfrac{1}{\sin^2\theta}$ is **[1]**

(a) 1 (b) 2 (c) -2 (d) -1

Q16. A cone of the largest possible size is carved out from a solid cube of edge l. Its base is a circle inscribed in the top face of the cube and its vertex touches the centre of the bottom face. The volume of the cone is: **[1]**

(a) $\frac{\pi l^3}{12}$ (b) $\frac{\pi l^3}{3}$ (c) $l^3\left(1 - \frac{\pi}{4}\right)$ (d) $\frac{\pi l^3}{8}$

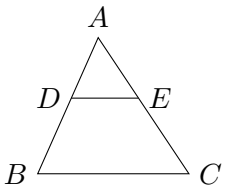
Q17. Consider the frequency distribution of 45 observations:

Class	0–10	10–20	20–30	30–40	40–50
Frequency	5	9	15	10	6

The upper limit of the median class is: **[1]**

(a) 20 (b) 10 (c) 30 (d) 40

Q18. In $\triangle ABC$, D lies on AB, E lies on AC and $DE \parallel BC$. If $AD = 4$ cm, $AB = 9$ cm and $AC = 13.5$ cm, then EC is equal to



[1]

(a) 6 cm (b) 7.5 cm (c) 9 cm (d) 5.7 cm

Q19. Assertion (A): If the radius of a sector of a circle is reduced to its half and the angle is doubled, then the perimeter of the sector remains the same.

Reason (R): The length of the arc subtending angle θ at the centre of a circle of radius r is $\dfrac{\pi r\theta}{180}$. **[1]**

(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.

Q20. Assertion (A): Two cubes, each of edge 4 cm, are joined end to end to form a cuboid. The total surface area of the cuboid is 160 cm^2.

Reason (R): The surface area of a cuboid of dimensions $l \times b \times h$ is $lb + bh + hl$. **[1]**

(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

Section B consists of 5 questions of 2 marks each.

Q21. Find the ratio in which the point $P(-4, 6)$ divides the line segment joining the points $A(-6, 10)$ and $B(3, -8)$. **[2]**

OR

OR The coordinates of the end points of the line segment AB are $A(-2,-2)$ and $B(2,-4)$. P is the point on AB such that $BP = \frac{4}{7}AB$. Find the coordinates of point P. **[2]**

Q22. Two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm. Find the length of each tangent. **[2]**

OR

OR Prove that the tangents drawn at the ends of a diameter of a circle are parallel. **[2]**

Q23. Evaluate $\dfrac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$. **[2]**

Q24. In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $AD = x$, $DB = x-2$, $AE = x+2$ and $EC = x-1$, find the value of x. **[2]**

OR

OR In the figure, $\triangle ABC \sim \triangle XYZ$ with $AB = 4$ cm, $BC = 6$ cm, $AC = y$ cm, $XY = x$ cm, $XZ = 6$ cm and $YZ = 7.2$ cm. Find the values of x and y. **[2]**

Q25. The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower, is 30°. Find the height of the tower. **[2]**

OR

OR From the top of a watch-tower 15 m high, the angle of depression of a boat on the sea is 30°. Find the distance of the boat from the foot of the tower. **[2]**

SECTION – C

Section C consists of 6 questions of 3 marks each.

Q26. Find the zeroes of the polynomial $4x^2 + 4x - 3$ and verify the relationship between the zeroes and the coefficients of the polynomial. **[3]**

OR

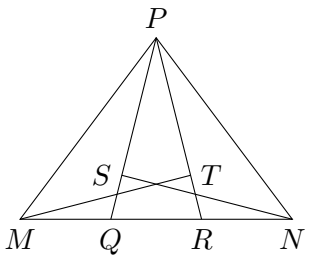
OR If a and b are the zeroes of the polynomial $x^2 + x - 2$, then find the value of $\frac{a}{b} + \frac{b}{a}$. **[3]**

Q27. Find the ratio in which the y-axis divides the line segment joining the points $(5,-6)$ and $(-1,-4)$. Also find the point of intersection. **[3]**

OR

OR A point $P(x,7)$ divides the line segment joining $A(-5,4)$ and $B(7,9)$ in a certain ratio. Find the ratio and hence find the value of x. **[3]**

Q28. In the given figure, Q and R lie on the base MN of $\triangle PMN$ in the order M, Q, R, N; S lies on PQ and T lies on PR; NS and MT are joined; $\triangle NSQ \cong \triangle MTR$ and $\angle 1 = \angle 2$. Prove that $\triangle PTS \sim \triangle PRQ$.



[3]

Q29. Three unbiased coins are tossed simultaneously. Find the probability of getting: (i) at least one head; (ii) exactly two tails; (iii) at most one tail. **[3]**

OR

OR Three unbiased coins are tossed simultaneously. Find the probability of getting: (a) exactly two tails; (b) at least one head; (c) at most two heads. **[3]**

Q30. Solve the pair of linear equations $62x + 43y = 167$ and $43x + 62y = 148$. **[3]**

OR

OR The sum of the digits of a two-digit number is 12. Seven times the number is equal to four times the number obtained by reversing its digits. Find the number. **[3]**

Q31. The sum of two numbers is 18 and the sum of their reciprocals is $\frac{9}{40}$. Find the numbers. **[3]**

SECTION – D

Section D consists of 4 questions of 5 marks each.

Q32. A craft teacher has three ribbons of lengths 252 cm, 396 cm and 540 cm. She wants to cut all three ribbons into pieces of one common length, as long as possible, so that no ribbon is left over.

(a) Find the length of each piece. [2 marks]

(b) How many pieces are obtained from each ribbon, and what is the total number of pieces? [2 marks]

(c) Find the LCM of 252 and 396, and verify that HCF $\times$ LCM = product of the two numbers. [1 mark] **[5]**

Q33. A straight highway leads to the foot of a 75 m high tower. A man standing on the top of the tower observes two cars, at angles of depression 30° and 60°, approaching the foot of the tower. If one car is exactly behind the other on the same side of the tower, find the distance between the two cars. (Use $\sqrt{3} = 1.73$.) **[5]**

OR

OR From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower, fixed at the top of a 20 m high building, are 45° and 60° respectively. Find the height of the tower. (Use $\sqrt{3} = 1.732$.) **[5]**

Q34. A chord of a circle of radius 14 cm subtends an angle of 60° at the centre. Find the area of the corresponding minor segment of the circle. Also find the area of the major segment of the circle. (Use $\pi = \frac{22}{7}$.) **[5]**

OR

OR An arc of a circle of radius 21 cm subtends an angle of 60° at the centre of the circle. Find: (i) the length of the arc; (ii) the area of the minor segment of the circle made by the corresponding chord. (Use $\pi = \frac{22}{7}$.) **[5]**

Q35. Cards marked with the numbers $1, 3, 5, \ldots, 49$ are placed in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability that the number on the card is (i) divisible by 3; (ii) a composite number; (iii) not a perfect square; (iv) a multiple of 3 and 5; (v) a prime number. **[5]**

SECTION – E

Section E consists of 3 case-study based questions of 4 marks each, with an internal choice in the 2-mark sub-part of each.

Q36. Read the following passage carefully and answer the questions that follow. **[4]**

In a pool at an aquarium, a dolphin jumps out of the water, travelling at 20 cm per second. Its height above the water level after t seconds is given by the polynomial $h(t) = 20t - 16t^2$, where the height is measured in cm and $h(t) = 0$ means the dolphin is at the water level.
Based on the above information, answer the following questions:

(i) Find the zeroes of the polynomial $p(t) = 20t - 16t^2$. [1]

(ii) At what time (in seconds) does the dolphin reach its maximum height? [1]

(iii) Find the height of the dolphin at $t = \frac{3}{2}$ s. What does the result tell you about the dolphin? [2]

OR

(iii) How much distance has the dolphin covered before it hits the water level again? [2]

Q37. Read the following passage carefully and answer the questions that follow. **[4]**

In a technology park in Hyderabad, a company has installed a circular meditation garden for its employees. Arjun, a designer, stood at a point P outside the garden and drew two tangents PA and PB to the circular boundary, touching it at A and B. The radius of the garden is 9 m and the distance of P from the centre O is 18 m. For preparing safety guidelines, Arjun needed the lengths of the tangents.
Based on the above information, answer the following questions:

(i) What is the measure of $\angle OAP$? [1]

(ii) Calculate the length of the tangent PA. [1]

(iii) Calculate the measure of $\angle AOB$. [2]

OR

(iii) If PA and PB were inclined at 60° (that is, $\angle APB = 60^\circ$), what would be the length of each tangent? [2]

Q38. Case Study: Enlarging a school photo **[4]**

While designing the school year book, a teacher asked a student to increase the length and the width of a particular photo by x units each, so that the area of the photo doubles. The original photo is 18 cm long and 12 cm wide.
Based on the above information, answer the following questions:

(i) Write an algebraic equation depicting the above information. [1]

(ii) Write the corresponding quadratic equation in standard form. [1]

(iii) What should be the new dimensions of the enlarged photo? [2]

OR

(iii) Can any rational value of x make the new area equal to 220 cm^2? [2]

***** END OF PAPER *****