

qpkit — Sample Paper

CBSE Class X Board Pattern

Class: X

Subject: Mathematics (Standard)

Time: 3 hours

Max. Marks: 80

General Instructions:

1. All questions are compulsory.
2. The question paper is divided into sections as shown below.
3. Marks for each question are indicated against it.
4. Draw neat figures wherever required.
5. Use of a calculator is not permitted.

SECTION A — MULTIPLE CHOICE QUESTIONS

1. Find the coordinates of the midpoint of the line segment joining $(2, -2)$ and $(-8, -4)$. 1
2. The quadratic equation $4x^2 - 7x + 10 = 0$ has 1
(A) two distinct real roots (B) two equal real roots
(C) no real roots (D) more than two real roots
3. Find the n th term of the AP $0, 7, 14, 21, \dots$ for $n = 26$. 1
4. Find the product of the zeroes of the polynomial $x^2 - 1$. 1
5. Tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 66° . Find $\angle POA$. 1
6. The angle of elevation of the top of a tower from a point on the ground, 45 m away from its foot, is 30° . Find the height of the tower. 1
7. If $\tan A = \frac{12}{5}$ for an acute angle A , find $\sin A$. 1
8. Which of the following equations has 4 as a root? 1
(A) $x^2 - 36 = 0$ (B) $3x^2 - 48 = 0$
(C) $2x^2 + 6x = 0$ (D) $x^2 - 10x + 25 = 0$
9. The zeroes of the polynomial $x^2 + 8x$ are 1
(A) $-7, -1$ (B) $-8, 0$
(C) $0, -7$ (D) $8, 0$
10. The pair of linear equations $3x + 6y = 14$ and $6x + 12y = 28$ has 1
(A) exactly one solution (B) no solution
(C) infinitely many solutions (D) exactly two solutions
11. A bag contains 11 green balls and 3 blue balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is green? 1

12. The distance between the points $(5, -7)$ and $(13, 8)$ is 1
 (A) 23 units (B) 289 units
 (C) 7 units (D) 17 units
13. Find the discriminant of the quadratic equation $x^2 - 13x + 1 = 0$. 1
14. Find the distance between the points $(6, -7)$ and $(1, 5)$. 1
15. The discriminant of the quadratic equation $4x^2 + 2x - 1 = 0$ is 1
 (A) 8 (B) -12
 (C) -20 (D) 20
16. State whether the pair of linear equations $8x + 4y = 15$ and $16x + 8y = 34$ is consistent or inconsistent. 1
17. Find the sum of the zeroes of the polynomial $2x^2 - 5x - 7$. 1
18. The distance between the points $(-5, 7)$ and $(2, 31)$ is 1
 (A) 17 units (B) 625 units
 (C) 31 units (D) 25 units
19. **Assertion (A):** The distance between $(-4, -4)$ and $(3, 20)$ is 25 units. 1
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.
20. **Assertion (A):** The distance between $(6, 2)$ and $(13, 26)$ is 25 units. 1
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 — VERY SHORT ANSWER QUESTIONS

21. E and F are points on the sides PQ and PR respectively of $\triangle PQR$. Given $PE = 16$ cm, $EQ = 7.5$ cm, $PF = 5.5$ cm and $FR = 9$ cm, state whether $EF \parallel QR$. Justify your answer. 2
22. A rope 30 m long is tightly stretched from the top of a vertical pole to a peg on the ground, making an angle of 30° with the ground. Find the height of the pole. 2
23. In $\triangle ABC$, right-angled at B, $AB = 112$ cm and $BC = 66$ cm. Determine $\sin A$, $\cos A$ and $\tan A$. 2
24. Find the LCM and HCF of 363 and 663, and verify that $\text{LCM} \times \text{HCF} = \text{product of the two numbers}$. 2

25. Find the area of a quadrant of a circle whose circumference is 264 cm. (Take $\pi = \frac{22}{7}$) 2

SECTION C — SHORT ANSWER QUESTIONS

26. In $\triangle ABC$, D and E are points on the sides AB and AC respectively such that $DE \parallel BC$. Prove that $AD \times EC = AE \times DB$. Hence, if $AD = 16$ cm, $DB = 4$ cm and $AE = 9$ cm, find EC. 3
27. From an external point A, two tangents AB and AC are drawn to a circle with centre O, touching it at B and C. Prove that $\angle BAC + \angle BOC = 180^\circ$. Hence, if $\angle BAC = 110^\circ$, find $\angle BOC$. 3
28. Given $\cot \theta = \frac{56}{33}$, calculate all the other trigonometric ratios of θ . 3
29. Two concentric circles are of radii 75 cm and 60 cm. Find the length of the chord of the larger circle which touches the smaller circle. 3
30. From the top of a building 45 m high, the angle of depression of a car is 30° . Find the horizontal distance of the car from the foot of a building. 3
31. From an external point P, two tangents PA and PB are drawn to a circle of radius 72 cm with centre O. If $OP = 90$ cm, find the length of each tangent and the perimeter of the quadrilateral OAPB. 3

SECTION D — LONG ANSWER QUESTIONS

32. A lot of 20 pens contains 6 defective ones. (i) One pen is drawn at random from the lot. What is the probability that this pen is defective? (ii) Suppose the pen drawn in (i) is not defective and is not replaced. Now one pen is drawn at random from the rest. What is the probability that this pen is not defective? 5
33. A contract on a construction job specifies a penalty for delay of completion beyond a certain date as follows: ₹250 for the first day, ₹350 for the second day, ₹450 for the third day, and so on, the penalty for each succeeding day being ₹100 more than for the preceding day. How much money must the contractor pay as penalty if the work is delayed by 25 days? 5
34. Two water taps together can fill a tank in $14\frac{2}{5}$ hours. The tap of larger diameter takes 12 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank. 5
35. The following frequency distribution gives the weights of students of a class. Find the mean, median and mode of the data and compare them. 5

Weight (in kg)	Number of students
40-45	23
45-50	24
50-55	7
55-60	12
60-65	4
65-70	16
Total	86

SECTION E — CASE STUDY BASED QUESTIONS

- 36.** For the temple festival procession, two groups of volunteers have to march in columns. The first group has 420 volunteers and the second has 196. Every column must hold the same number of volunteers, and no group may be split between columns. **4**
- (i) Express 420 as a product of its prime factors. 1
- (ii) Find the largest number of volunteers that a column can hold if both groups march in columns of that size. 1
- (iii) The organiser suggests columns of 7 volunteers. Is that possible for both groups? Justify your answer. 2
- 37.** A ground-level water reservoir serving a village is built as a cylinder of radius 10.5 m and height 13 m, with a hemispherical dome of the same radius fixed on top. The panchayat needs to know how much water it holds and how much paint the outside will take. (Take $\pi = \frac{22}{7}$) **4**
- (i) Write the formula for the volume of the hemispherical dome. 1
- (ii) Find the volume of the cylindrical part of the tank. 1
- (iii) Find the total capacity of the tank. 2
- 38.** A craftsperson is making a circular rangoli design of radius 10.5 cm. The circle is divided into 4 equal sectors by straight lines drawn from the centre, and each sector is to be filled with coloured powder of a different colour. (Take $\pi = \frac{22}{7}$) **4**
- (i) Find the angle of each sector at the centre. 1
- (ii) Find the area of one sector. 1
- (iii) Find the total area of the design and the length of the circular border around it. 2

— END OF QUESTION PAPER —