CBSE
Class X Mathematics (Standard)
Sample Paper – 4 (2024-25)

Time: 3 Hours   **Total Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections A - E.

2. Section A has 18 multiple choice questions and 2 Assertion-Reason based

   questions carrying 1 mark each.

3. Section B has 5 questions carrying 02 marks each.

4. Section C has 6 questions carrying 03 marks each.

5. Section D has 4 questions carrying 05 marks each.

6. Section E has 3 case based integrated units of assessment (04 marks each) with
   subparts of the values of 1, 1 and 2 marks each respectively.

7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2
   Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice
   has been provided in the 2 marks questions of Section E.

8. Draw neat figures wherever required. Take π = 22/7 wherever required if not

   stated.

Section A
Section A consists of 20 questions of 1 mark each.

Choose the correct answers to the questions from the given options.   [20]

1. Each rational number can be represented as p/q, such that_____
     A.   p and q are co-prime
     B.   p and q are even numbers
     C.   p and q are odd numbers
     D.   p and q are equal to prime numbers

2. Find the zeroes of the following quadratic polynomial $x^2 - 2x - 8$.
     A.   2 and 4
     B.   4 and −2
     C.   ±2
     D.   −2 and −4

3. Sum of the zeroes of the polynomial $x^2 - 5x + 6 = 0$ is…
A. 3
B. 2
C. 5
D. 6

4. The sum of two numbers is 18, and they are alternate even numbers, find the largest out of the two.
A. 4
B. 6
C. 8
D. 10

5. The lines represented by system of equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are not parallel if
A. $a_1b_2 \neq a_2b_1$

B. $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2}$

C. $\dfrac{a_1}{b_2} \neq \dfrac{b_1}{a_2}$

D. $a_1b_1 = a_2b_2$

6. Any point on x axis will have…
A. Both x and y coordinate zero
B. x coordinate zero
C. y coordinate zero
D. Both x and y coordinate 1

7. Given below, is the graph showing the location of Raju's house, garden and playground.
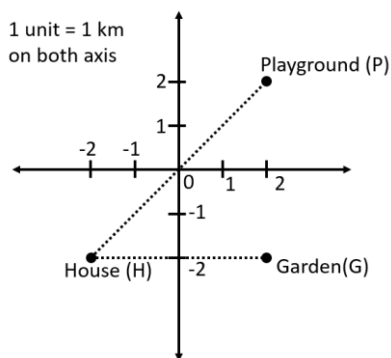
Now, which of the following options is incorrect?
A. d(HP) > d(HG)
B. d(GP) = d(HG)
C. d(HP) < d(GP)
D. d(HP) > d(GP)

8. P and Q are points on sides AB and AC, respectively, of ΔABC. If AP = 3 cm, PB = 6 cm, AQ = 5 cm and QC = 10 cm, then BC =?
   A. 4PQ
   B. 3PQ
   C. 2PQ
   D. PQ

9. ΔABC ~ ΔDEF, such that AB = 3 cm, BC = 2 cm, CA = 2.5 cm, EF = 4 cm. The perimeter of ΔDEF is
   A. 15 cm
   B. 20 cm
   C. 12 cm
   D. 18 cm

10. The perimeters of two similar triangles ABC and PQR are 32 cm and 24 cm, respectively. If PQ = 12 cm, then find AB.
    A. 12 cm
    B. 16 cm
    C. 18 cm
    D. 23 cm

11. Find the value of sec A, if tan A = $\sqrt{3}$.
    A. 2
    B. −2
    C. ±2
    D. None of these

12. sin 2A = $\sqrt{3}$ sin A for the value of A =
    A. 30°
    B. 45°
    C. 60°
    D. 90°

13. If ΔABC is right angled at C, then find the value of cos (A + B).
    A. 0
    B. −1
    C. 1
    D. 2

14. The total surface area of a right circular cylinder is given by…
    A. $2\pi r(r + h)$
    B. $2\pi r(r - h)$
    C. $2r(r + h)$
    D. $\pi r(r + h)$

15. The length of a chain used as the boundary of a semi-circular park is 90 m. Find the area of the park.
   A.   481.5 m^2
   B.   481.35 m^2
   C.   4812.5 m^2
   D.   481.25 m^2

16. Find the mode

Marks obtained	Frequency
15	11
21	15
24	20
26	30
28	14
29	10

   A.   21
   B.   24
   C.   26
   D.   29

17. 250 lottery tickets were sold and there are 5 prizes on these tickets. If Kunal has purchased one lottery ticket, what is the probability that he wins a prize?
   A. $\dfrac{1}{50}$
   B. $\dfrac{1}{25}$
   C. $\dfrac{1}{5}$
   D.   1

18. The median of a distribution divides it into
   A.   Two equal parts
   B.   Three equal parts
   C.   Four equal parts
   D.   Does not divide into any parts

DIRECTION: In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option

19. **Statement A (Assertion):** If the points A(4, 3) and B(x, 5) lie on a circle with centre O(2, 3), then the value of x is 2.
   Statement R (Reason): Centre of a circle is the mid-point of each chord of the circle.

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 and 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. **Statement A (Assertion):** $\dfrac{4}{5}$, a, 2 are three consecutive terms of an AP only

   if $a = \dfrac{7}{5}$.

   Statement R (Reason): If p, q and r are in A.P then q – p = r – q.
   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 and 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

21. The HCF of 110 and 65 is (42a – 205). Find the value of a. [2]

22. If α, β are zeroes of the polynomial p(x) = 5x^2 – 6x + 1, then find the value of α + β + αβ. [2]

23. Two tangent segments BC and BD are drawn to a circle with centre O such that $\angle$CBD = 120°. Prove that OB = 2BC. [2]
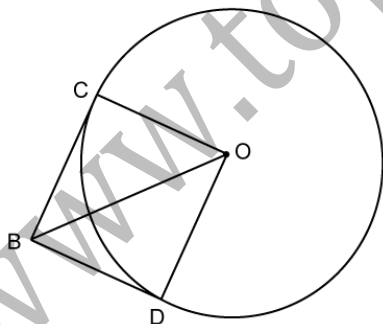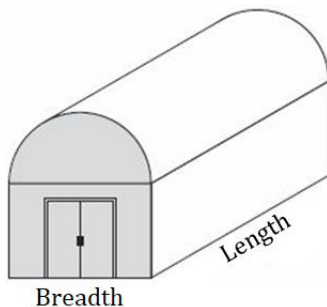

24. Prove that $\sqrt{\dfrac{1 - \cos A}{1 + \cos A}} + \sqrt{\dfrac{1 + \cos A}{1 - \cos A}} = 2\cos ecA$ [2]

OR

If $\sqrt{3}\tan\theta - 1 = 0$, find the value of sin^2 θ – cos^2 θ.

25. Nisha's mother stored antiques in a box which is in the shape of a cuboid at the bottom and half cylinder at the top as shown below: [2]

Nisha estimates the measures as Length = 3 times height & breadth = 7/5 times height.

According to her mother, the total height of the cuboid is 0.5 m. What is the total surface area of the box? (Take π = 22/7)

OR

A cuboidal jar with height 14 cm is ¾ filled with sugar. If the length and breadth of the jar is 9 cm each, how much more sugar (in kg) can be put in the jar so that it is filled completely?

Section C
Section C consists of 6 questions of 3 marks each.

26. Find the LCM and HCF of the following integers by applying the prime factorisation method. [3]

(i)　　12, 15 and 21

(ii)　　17, 23 and 29

27. John and Jayanti together have 45 marbles. Both of them lost 5 marbles each, and the product of the number of marbles they now have is 124. Find out how many marbles they had. [3]

28. A fraction becomes $\dfrac{1}{3}$, if 2 is added to both its numerator and denominator. If

3 is added to both its numerator and denominator, then it becomes $\dfrac{2}{5}$. Find

the fraction. [3]

OR

Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages?

29. If two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm, then find the length of each tangent. [3]

OR

Arjun is standing at a point P, which is 25 m away from the centre (O) of a circular park, and the length of a road from the point P to the gate of the park (A) is 24 m.
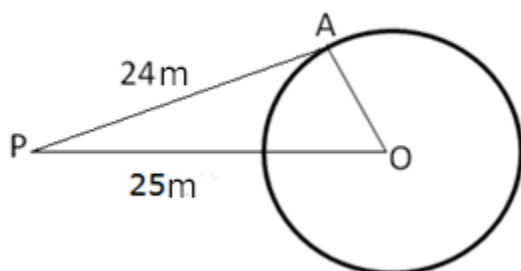
Find the distance of the centre of park to the gate.

30. If x = cot A + cos A and y = cot A − cos A, then show that

$$\left(\frac{x-y}{x+y}\right)^2 + \left(\frac{x-y}{2}\right)^2 = 1$$ [3]

31. 2 Red kings, 2 red queens and 2 red jacks are removed from a deck of 52 playing cards and then well shuffled. A card is drawn from the remaining cards. Find the probability of getting (i) a king, (ii) a red card, (iii) a spade. [3]

Section D
Section D consists of 4 questions of 5 marks each.

32. A passenger train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find its usual speed. [5]

OR

The distance between Mumbai and Pune is 192 km. Travelling by the Deccan Queen, it takes 48 minutes less than another train. Calculate the speed of the Deccan Queen if the speeds of the two trains differ by 20 km/hr.

33. In figure, DE || OQ and DF || OR, show that EF || QR. [5]
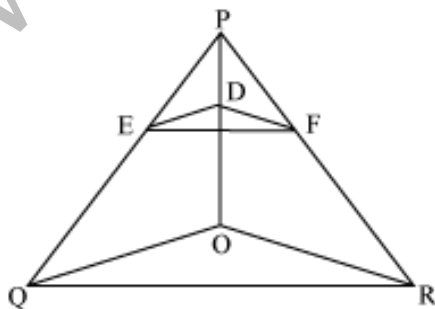
34. A gulab jamun, when ready for eating, contains sugar syrup of about 30% of its volume. How much syrup would be found in 45 such gulab jamuns, each shaped like a cylinder with two hemispherical ends, if the complete length of each of them is 5 cm and its diameter is 2.8 cm? [5]

OR

A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8 g mass. (Use п = 3.14)

35. Thirty women were examined in a hospital by a doctor and the number of heart beats per minute were recorded and summarized as follows. Fine the mean heart beats per minute for these women, choosing a suitable method. [5]

Number of heart beats per minute	65 – 68	68 – 71	71 – 74	74 – 77	77 – 80	80 – 83	83 – 86
Number of women	2	4	3	8	7	4	2

Section E
Case study based questions are compulsory.

36. Rukhsar is celebrating her birthday. She invited her friends. She bought a packet of chocolates which contains 120 chocolates. She arranges the chocolates such that in the first row there are 3 chocolates, in second there are 5 chocolates, in third there are 7 chocolates and so on.
   i.   Find the total number of rows of chocolates. [1]
   ii. How many chocolates are placed in last row? [2]

OR

   Find the difference in number of chocolates placed in 7th and 3rd row. [2]
   iii. If Rukhsar decides to make 15 rows, then how many total chocolates will be placed by her with the same arrangement? [1]

37. Bus number 735 travels from source O to A, and Bus number 736 travels from Source O to B, then reaches A. The routes taken by both the buses are shown below. Using the details given, answer the following questions.
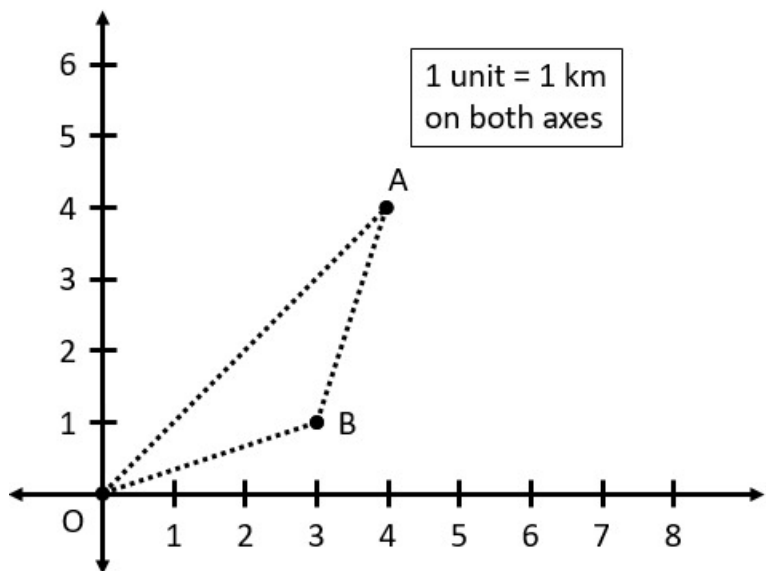
i. Find the distance covered by Bus No. 735. [1]
ii. Find the distance between locations B and A. [2]

OR

Find the distance between locations O and B. [2]
iii. Find the distance covered by Bus No. 736. [1]

38. Vinod, an electrician, has to repair an electric wire on the pole AX which is of height 10 m. For the repair, he needs to reach a point B which is 4 m below the top of the pole, using a ladder from the point C. The ladder makes an angle of $60°$ with the ground. Based on the above information, answer the following questions.
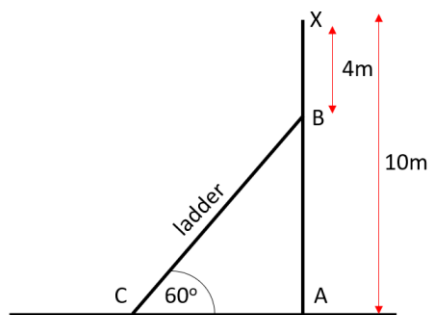
i. Find the length of AB. [1]
ii. If the ladder makes an angle of $60°$ with the ground, what is the distance between the foot of the ladder and the pole? [2]

OR

If the ladder makes an angle of $60°$ with the ground, then the length of ladder will be? [2]
iii. If AB = AC, what angle should the ladder make with the ground? [1]