CBSE

Class X Mathematics (Standard)

Sample Paper – 2 (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]

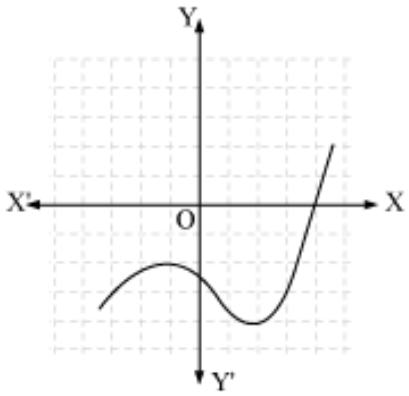
1. Find LCM of 336 and 54.

A. 3042
B. 3024
C. 3204
D. 3044

2. Find the discriminant of the following equation: $3x^2 - 2x + 8 = 0$

A. −94
B. 94
C. 92
D. −92

3. The graph of y = p(x) is given in the following figure for some polynomial p(x). Find the number of zeroes of p(x).

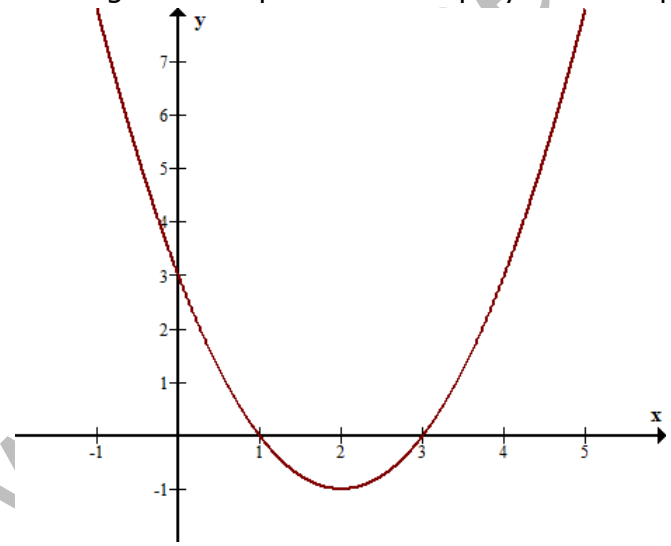


A. 2
B. 1
C. 0
D. 3

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 algebraic expression of a polynomial representing the following parabola is



A. $x^2 + 4x + 3$
B. $x^2 + 4x - 3$
C. $x^2 - 4x - 3$
D. $x^2 - 4x + 3$

6. Find the coordinates of the point equidistant from three points A(5, 3), B(5, –5) and C(1, –5).
A. (2, –1)
B. (3, –1)
C. (4, –1)
D. (5, –1)

7. If sum of the zeros of a cubic polynomial $ax^3 + (-7x^2) + (-13x) + (d)$ is $\frac{7}{5}$ and product of zeroes is 1, then the values of 'd' and 'a' are
A. 5, 5
B. –5, 5
C. 5, –5
D. –5, –5

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

9. Following is not a test of similarity
A. SSS
B. SAS
C. AAA
D. SSA

10. If $\Delta ABC \sim \Delta DEF$ such that 2AB = DE and BC = 6 cm, find EF.
A. 10 cm
B. 12 cm
C. 1 cm
D. 4 cm

11. Find the value of θ if $\tan\theta = \cot\theta$
A. 30°
B. 60°
C. 45°
D. 90°

12. If $2\sin^2\theta - \cos^2\theta = 2$, then find the value of θ.
A. 100°
B. 70°
C. 90°
D. 80°

13. Raju and Ravi are standing at an equal distance from a Pole, but on the opposite sides. Both are looking at the top of the pole. The angle of elevation of Raju's eye sight from the horizontal is 30°, and that of Ravi is 45°.
If so, then which of the following statement is true?
A. Raju is taller than Ravi
B. Ravi is taller than Raju
C. Both Raju and Ravi have same heights
D. Data is insufficient to compare the heights of Raju and Ravi

14. Find the area of a sector with radius 7 cm and central angle 90°.
A. 38 cm^2
B. 39 cm^2
C. 38.5 cm^2
D. 37.5 cm^2

15. 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. $\pi r(r + h)$

16. Find the modal class from the following table:

Size	Frequency
45-55	7
55-65	12
65-75	17
75-85	30
85-95	32
95-105	6
105-115	10

A. 75-85
B. 85-95
C. 95-105
D. 105-115

17. Cards bearing numbers 1, 3, 5,…, 35 are kept in a bag. A card is drawn at random from the bag. Find the probability of getting a card bearing a prime number less than 15.
A. 3/18
B. 4/18
C. 5/18
D. 7/18

18. Netra has a total of 361 songs in her playlist out of which 165 are Hindi, 87 are Punjabi and 109 are English. She starts listening to music by choosing the first song from Hindi category. She will continue listening if the next song which will be played automatically is Punjabi. What is the probability that Netra will continue listening to music?

A. 87/361
B. 87/360
C. 109/361
D. 109/360

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)**: From a solid cylinder whose height is 8 cm and radius is 6 cm, a conical cavity of height 8 cm and of base radius 6 cm is hollowed out. Hence the volume of the remaining solid will be 192 cm^3.
Statement R (Reason): Volume of remaining solid = Volume of the cylinder - Volume of the cone removed

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.

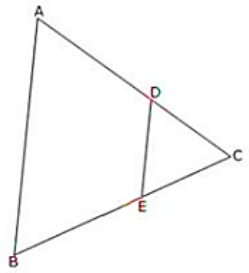
20. **Statement A (Assertion)**: $\frac{4}{5}$, a, 2 are three consecutive terms of an AP only if $a = \frac{7}{5}$.
Statement R (Reason): If p, q and r are in A.P then q – p = r – q.

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.

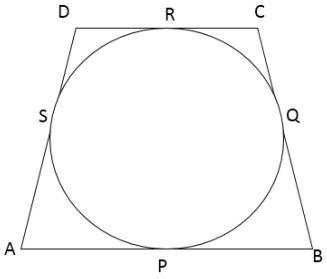
Section B

21. Mr. Shastri's cell phone PIN is dbac such that 42000 = $a^4 \times b \times c^3 \times d$. Find the PIN. [2]

22. In figure, If ∠A = ∠B and AD = BE show that DE || AB in ΔABC. [2]



23. In the given figure, a circle touches all the four sides of a quadrilateral ABCD whose three sides are AB = 6 cm, BC = 7 cm and CD = 4 cm. Find AD. [2]



24. Prove that: $(\sin\theta + \cos\theta)(\tan\theta + \cot\theta) = \sec\theta + \operatorname{cosec}\theta$ [2]

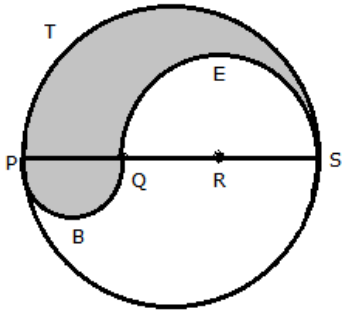
OR

In ΔPQR, right angled at Q, PR + QR = 25 cm and PQ = 5 cm. Determine the values of sin P, cos P and tan P.

25. Find the area of a sector of a circle with radius 6 cm, if angle of the sector is 60°. [2]

OR

PQRS is a diameter of a circle of radius 6 cm. The lengths PQ, QR and RS are equal. Semicircles are drawn with PQ and QS as diameters, as shown in the given figure. If PS = 12 cm, find the perimeter and area of the shaded region. (Take π = 3.14)



Section C

Section C consists of 6 questions of 3 marks each.

26. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108, respectively. Find the minimum number of rooms required, if in each room the same number of participants are to be seated and all of them being in the same subject. [3]

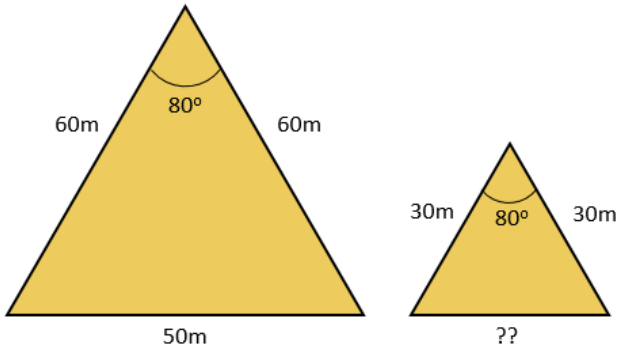
27. Verify the relationship between the zeroes and the coefficients of $t^2 - 15$. [3]

28. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Formulate the quadratic equation in terms of speed of the train. [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?

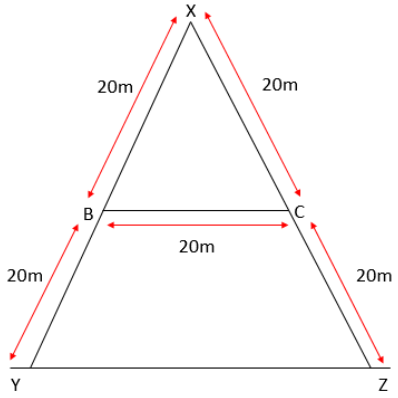
29. Atul went to Egypt to see the pyramids. Now the front side of two adjacent pyramids are as shown in the figure below. [3]



Calculate the base of the smaller pyramid.

OR

A TV tower is erected on the ground as shown in the figure below. Two ends of the tower are XY and XZ, and BC is the support to keep the two ends from falling apart. If BC is parallel to the ground, then find the distance YZ.



30. If $\cos\theta = \frac{7}{25}$, find the values of all T-ratios of θ. [3]

31. A box contains 20 balls bearing numbers 1, 2, 3,…, 20, respectively. A ball is taken out at random from the box. Find the probability that the number on the ball is [3]

i. an even number
ii. divisible by 2 and 3
iii. a prime number

Section D

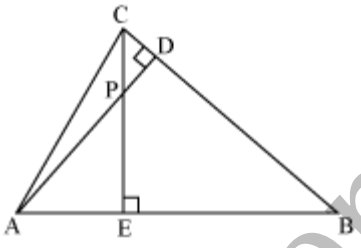
Section D consists of 4 questions of 5 marks each.

32. The sum of the reciprocals of Rehman's ages, (in years) 3 years ago and 5 years from now is $\frac{1}{3}$. Find his present age. [5]

OR

A rectangular field is 16 m long and 10 m wide. There is a path of uniform width all around it with an area of 120 m^2. Find the width of the path. [5]

33. In the figure, altitudes AD and CE of ΔABC intersect each other at the point P. Show that [5]



i. ΔAEP ~ ΔCDP
ii. ΔABD ~ ΔCBE
iii. ΔAEP ~ ΔADB
iv. ΔPDC ~ ΔBEC

34. A tent is in the shape of a right circular cylinder up to a height of 3 m and conical above it. The total height of the tent is 13.5 m, and the radius of its base is 14 m. Find the cost of cloth required to make the tent at the rate of Rs. 80 per square metre. Take $\pi = 22/7$. [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 π = 3.14)

35. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is Rs. 18. Find the missing frequency f. [5]

Daily pocket allowance (in Rs.)	11 – 13	13 – 15	15 –17	17 – 19	19 – 21	21 – 23	23 – 25
Number of children	7	6	9	13	f	5	4

Section E
Case study based questions are compulsory.

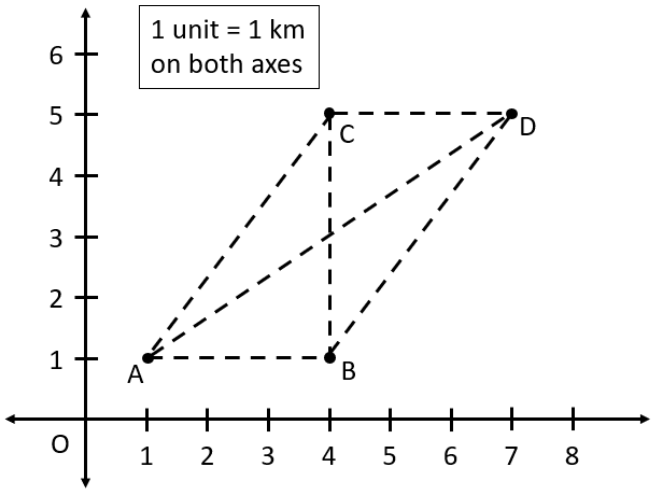
36. It is festival time, and smartphone companies have come up with no-cost EMI plans to sell their flagship models. Now Aarushi always wanted to buy a flagship smartphone, so she decided to take advantage of this offer. She buys a smartphone on EMI of Rs. 1000 per month. Now, she pays Rs. 1000 for the first month and decides to make the subsequent payment in such a manner that the current month's payment will always be Rs. 100 more than the previous month. Now, using the information given, answer the following questions.

i. Find the amount paid by her in 30^{th} month. [1]
ii. For a particular month, Aarushi pays Rs. 4900 as an instalment; find which month this is. [1]
iii. Find the ratio of the payment made in 19^{th} month to the 28^{th} month. [2]

OR

Find the total amount paid by Aarushi in 30 months.

37. Amey runs a grocery store that offers home delivery of fresh groceries to its customers. His store is located at location A as indicated in the map below. Now, he receives regular orders from the families living in the colonies located at locations B, C and D. Given below is the map containing the location of the store, colonies and the roads connecting them. Use the given information to answer the below questions.



i. Find the shortest distance between locations A and C. [2]

OR

Find the shortest distance between locations B and D.

ii. If point X lies at the midpoint of line segment joining A and B, then find its co-ordinates. [1]

iii. If Amey needs to travel back from location C to location B, then find the shortest distance covered by him. [1]

38. Harsh is standing between two poles having a height 10 m and 15 m. Now, the angle of elevation from the point where Harsh is standing to the top of the 10 m pole is 45°, whereas the angle of elevation from the same point to the top of 15 m pole is 60°. Using the given data, answer the following questions.

i. Draw a neat labelled figure to show the above situation diagrammatically. [1]

ii. Find the distance between Harsh and 15 m pole. [1]

iii. Find the minimum rope length required to tie the top of 10 m pole to point where Harsh is standing. [2]

OR

If a ladder is kept touching the point where Harsh is standing and the top of 15 m pole, then find the length of the ladder required.