SET-1

Candidates must write the Set No.
on the title page of the answer book.

Roll No.

SAHODAYA PRE-BOARD EXAMINATION-(2024-25)

- Please check that this question paper contains **08** printed pages.
- Set number given on the right-hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **38** questions.
- Please write down the serial number of the question in the left side margin of the answer book before attempting it.
- **15** minutes time has been allotted to read this question paper. The question paper will be distributed 15 minutes prior to the commencement of the examination. The students will read the question paper only and will not write any answer on the answer script during this period. Students should not write anything in the question Paper.

CLASS-X

SUBJECT: MATHEMATICS (STANDARD – 041)

Time Allowed: 3 hours   **Maximum Marks – 80**

General Instructions:

**Read the following instructions carefully and strictly follow them:**

1. This question paper contains 38 questions.
2. This Question Paper is divided into five Sections: **A, B, C, D and E.**
3. In **Section A,** Question No. **1 to 18** are Multiple Choice Questions (MCQ) and Question no. No.**19** and **20** are Assertion-Reason based questions of **1** mark each.
4. In **Section B**, Question no. **21 to 25** are Very Short Answer (VSA) type questions**,** carrying **2** marks each.
5. In **Section C**, Question no. **26 to 31** are Short Answer (SA) type questions**,** carrying **3** marks each.
6. In **Section D**, Question no. **32 to 35 are** Long Answer (LA) type question**,** carrying **5** marks each.
7. In **Section E**, Question no. **36 to 38** are case-based question carrying **4** marks each with sub parts of the values of **1**, **1** and **2** marks each respectively.
8. All questions are compulsory. However, an internal choice in **2** questions of section B, **2** questions of section C and **2** questions of section D has been provided. Also, an internal choice has been provided in all the **2** marks question of Section E.
9. Take $\pi = \frac{22}{7}$ wherever required if not stated.
10. Use of calculators is **not** allowed.

SECTION – A

(This section comprises 20 Multiple Choice Questions (MCQs) carrying 1 mark each.)

1. The quadratic polynomial, whose zeroes are $3 + \sqrt{2}$ and $3 - \sqrt{2}$ is:

   (A) $x^2 - 3x + 5$ (B) $x^2 - 6x + 7$ (C) $x^2 - 7x + 6$ (D) $x^2 - 8x + 12$

2. The value of k for which the lines $5x + 7y = 3$ and $15x + 21y + k = 0$ coincide is:

   (A) 9   (B) 5   (C) 7   (D) -9

3. In the adjoining figure, AB is a chord of the circle and AOC is its diameter such that $\angle ACB = 50°$. If AT is the tangent to the circle at the point A, then $\angle$BAT is equal to:
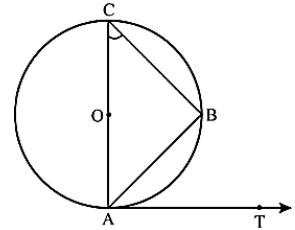
   (A) $65°$ (B) $60°$ (C) $50°$ (D) $40°$

4. The common difference of an A.P. in which $a_{18} - a_{14} = 32$ is:

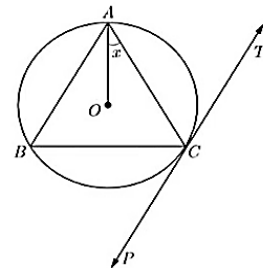   (A) $\dfrac{16}{15}$ (B) -4 (C) 28   (D) 8

5. A right circular cylinder of radius r cm and height h cm $(h = 2r)$ just encloses a sphere of diameter

   (A) r cm   (B) $2r$ cm   (C) h cm   (D) $2h$ cm

6. If $4\tan\theta = 3$, then the value of $\dfrac{4\sin\theta - \cos\theta}{4\sin\theta + \cos\theta}$ is:

   (A) $\dfrac{1}{2}$ (B) $\dfrac{3}{4}$ (C) $\dfrac{3}{5}$ (D) $\dfrac{2}{5}$

7. In the adjoining figure, PT is a tangent at point C of the circle. O is the circumcenter of $\triangle$ABC. If $\angle ACP = 118°$, then the measure of x is:

   (A) $28°$ (B) $38°$ (C) $42°$ (D) $48°$

8. If α and β are zeroes of the quadratic polynomial $x^2 - (k + 6)x + 2(2k - 1)$, find the value of k, if $\alpha + \beta = \dfrac{1}{2}\alpha\beta$.

   (A) 14   (B) -14 (C) 7   (D) -7
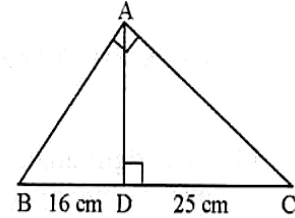
9. For the following frequency distribution

Class Interval	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

The sum of lower limit of Median class and upper limit of Modal class is:

(A) 15   (B) 25   (C) 30   (D) 35

10. In the adjoining figure, $\angle BAC = 90°$, AD $\perp$ BC, BD = 16 cm, CD = 25 cm, then AD is:

(A) 7 cm   (B) 7.5 cm   (C) 8 cm   (D) 20 cm

11. The discriminant of the equation, $x^2 - 7 = 0$ is:

(A) – 27   (B) 28   (C) 48   (D) – 48

12. If $sin\theta - cos\theta = 0$, then the value of $sin^4\theta + cos^4\theta$ will be:

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{3}{4}$ (D) 1

13. Two cubes each of volume $8\ cm^3$ are joined end to end, then the surface area of the resulting cuboid is:

(A) $80\ cm^2$ (B) $64\ cm^2$ (C) $40\ cm^2$ (D) $8\ cm^2$

14. A card is drawn from a deck of 52 playing cards. What is the probability that the drawn card is neither an ace nor a spade?

(A) $\frac{9}{13}$ (B) $\frac{10}{13}$ (C) $\frac{17}{52}$ (D) $\frac{35}{52}$

15. The perpendicular distance of the point $P(3, 5)$ from the x-axis is:

(A) 1   (B) 5   (C) $-\frac{1}{5}$ (D) $\frac{1}{5}$

16. If the difference of mode and median of a data is 24, then the difference of median and mean is:

(A) 8   (B) 12   (C) 24   (D) 36

17. The point which lies on the perpendicular bisector of the line segment joining the points A$(-2,3)$ and B$(2, -5)$ is:

(A) $(0,1)$ (B) $(0, -1)$ (C) $(-1,0)$ (D) $(-2,0)$

18. The probability of getting a good egg in a lot of 400 is 0.965. The number of bad eggs in the lot is:

(A) 7   (B) 14   (C) 21   (D) 28

*Question number **19** and **20** are Assertion and Reason based question. Two statement, one labeled as Assertion (A) and other is labeled as reason (R).Select the correct answer to these question from the code (A),(B),(C) and (D) as given below.*

(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

19. **Assertion (A):** if the sum of two numbers is 528 and their HCF is 33, then the number of such possible pairs is 3.

   Reason (R): HCF of two co-prime numbers is 1.

20. **Assertion (A):** If the circumferences of two circles are in the ratio 4 : 5, then their areas are in the ratio 16:25.

   Reason (R): If the circumferences of two circles are in the ratio C_1:C_2, then their areas are in the ratio $C_1{}^2$:$C_2{}^2$.

SECTION - B

(This section comprises of Very Short Answer (VSA) type questions of 2 marks each)

$$(5 \times 2 = 10)$$

21. A rope of length 140 cm has to be cut into 2 pieces in the ratio 3:4. What is the maximum length of the measuring stick which should be used to measure both the lengths?

OR

On a morning walk, three persons steps off together and their steps measure 40 cm, 42 cm, and 45 cm respectively. What is the minimum distance each should walk, so that each can cover the same distance in complete steps?

22. A number is selected from first 50 natural numbers. What is the probability that it is a multiple of 3 or 5?

OR

Three different coins are tossed together. Find the probability of getting at most two heads.

23. Find the value of $sin^3 60°.cot30° - 2sec^2 45° + 6\cos 60°.tan45°$

24. Find the ratio in which $P(4, m)$ divides the line segment joining the points $A(2,3)$ and $B(6, -3)$. Hence find the value of m.

25. If the mid-point of the line segment joining the points $A(3,4)$ and $B(k,6)$ is $P(x, y)$ and point P lies on the line $x + y - 10 = 0$, find the value of k.

SECTION-C

(This section comprises of Short Answer type questions (SA) of 3 marks each)

$(6 \times 3 = 18)$

26. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio.

OR

In the given Figure, M is mid-point of side CD of a parallelogram ABCD. The line BM is drawn intersecting AC at L and AD produced at E. Prove that $EL = 2BL$.
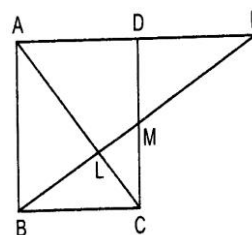
27. A pole has to be erected at a point on the boundary of a circular park of diameter 13 meters in such a way that the difference of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 meters. Is it the possible to do so? If yes, at what distances from the two gates should the pole be erected?

28. If α and β are the zeros of the quadratic polynomial $f(x) = x^2 - p(x + 1) - c$, show that $(\alpha + 1)(\beta + 1) = 1 - c$.

29. Prove that: $\dfrac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \dfrac{1}{\sec\theta - \tan\theta}$

30. The central angles of two sectors of circles of radii 7 cm and 21 cm are respectively $120°$ and $40°$. Find the areas of the two sectors as well as the lengths of the corresponding arcs of two sectors. What do you observe?

OR

The length of hour hand of a clock is 6 cm. Find the area swept by the hour hand in 36 minutes.

31. Prove that $2 - 3\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is irrational.

SECTION D

**(This section comprises of Long Answer (LA) type questions of 5 marks each)**

$(4 \times 5 = 20)$

32. Draw the graph of $2x + y = 6$ and $2x - y + 2 = 0$. Shade the region bounded by these lines and x-axis. Find the area of the shaded region.

OR

Taxi charges in a city consist of fixed charges and the remaining charges depend upon the distance travelled. For a journey of 10 km, the charge paid is Rs. 75 and for a journey of 15 km, the charge paid is Rs. 110. Find the fixed charge and charges per km. Hence, find the charge of covering a distance of 35 km.

33. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively. Find the sides AB and AC.
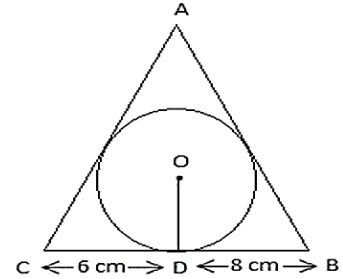
34. The angle of elevation of a cloud from a point 60m above a lake is 30° and the angle of depression of the reflection of cloud in the lake is 60°. Find the height of the cloud from the lake level

35. Find the values of x and y, if the median of the following data is 31.

Class	0-10	10-20	20-30	30-40	40-50	50-60	Total
frequency	5	x	6	y	6	5	40

OR

The daily wages of 110 workers obtained in a survey are tabulated below. Compute the mean daily wages and modal daily wages of these workers.

Daily wages (Rs)	100-120	120-140	140-160	160-180	180-200	200-220	220-240
No of Workers	10	15	20	22	18	12	13

SECTION E

(This section comprises 3 case-based questions of 4 marks each) $(3 \times 4 = 12)$

36. A leading manufacturing company manufactures 18000 LED TVs in the second year and 19800 LED TVs in tenth year. Assuming that the company increases the manufacturing of LED TV uniformly every year by fixed numbers.
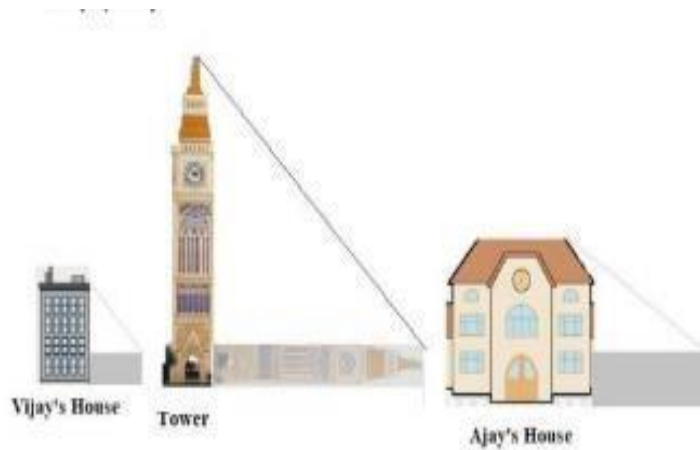
On the basis of above information answer the following questions:

(i) How much, the manufacturing of LED TV is increased every year? (1)

(ii) How many LED TVs were manufactured in the seventh year? (1)

(iii) (a) How many LED TVs were manufactured in ten years? (2)

OR

(b) If company is 12 years old, find number of LED TVs produced in last 3 years?

37. Vijay is trying to find the average height of a tower near his house. He is using the properties of similar triangles. The height of Vijay's house is $20\ m$. When Vijay's house casts a shadow $10\ m$ long on the ground, at the same time, the tower casts a shadow $50\ m$ long on the ground and the house of Ajay casts $20\ m$ shadow on the ground.


Vijay's House   Tower   Ajay's House

On the basis of above information, answer the following questions:

(i) Find the height of the tower. (1)

(ii) Find the length of the shadow of the tower when Vijay's house casts a shadow of $12\ m$. (1)

(iii) (a) Find the length of the shadow of Ajay's house at the time when the tower casts a shadow of $40\ m$. (2)

OR

(b) Find the length of the shadow of Vijay's house at the time when the tower casts a shadow of length $40\ m$.

38. Raghav and his family went for vacation to Rajasthan. There they had a stay in tent for a night Raghav found that the tent in which they stayed is in the form of a cone surmounted on a cylinder. The total height of the tent is $35\ m$. Diameter of the base is $56\ m$ and height of the cylinder is $14\ m$.
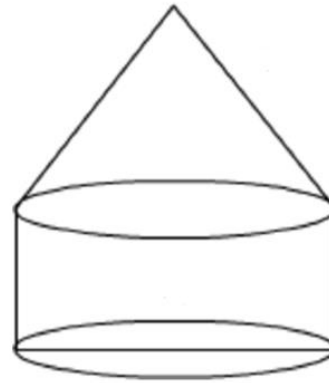
On the basis of the above information answer the following questions

(i) If each person needs $176\ m^2$ of floor, then how many persons can be accommodated in the tent? (1)

(ii) Find the surface area of the conical part. (1)

(iii) (a) How much canvas is needed to make the tent? (2)

OR

(b) Find the volume of the tent. (2)