CLASS - X STANDARD (CBSE SAMPLE PAPER) | MATHEMATICS

SAMPLE PAPER - 04

TIME : 3 HRS. **MAX. MARKS : 80**

General Instructions :

- **All questions are compulsory.**
- **The question paper consists of 38 questions divided into five sections A, B, C, D and E.**
- **Section A contains multiple choice questions (Q.1 to Q.20) of one mark, only the correct option is to be written in your answer sheet.**

  Section B contains short answer type questions (Q.21 to Q.25) carrying two marks each.

  Section C contains short answer type questions (Q.26 to Q.31) carrying three marks each.

  Section D contains short answer type questions (Q.32 to Q.35) carrying five marks each.

  Section E has 3 case based integrated units of assessment 4 marks each with sub-parts of the values of 1, 1 and 2 marks each respectively.
- **All Questions are compulsory. However, an internal choice in 2 Questions of 2 marks, 2 Questions of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2marks sub part of questions of Section E**
- **There is no overall choice. However, internal choice may be provided . You have to attempt only one of the alternatives in all such questions.**
- **Use of calculators and cell-phones are not permitted in the Examination Hall.**

SECTION-A

1. Consider the following frequency distribution of the heights of 60 students of a class

Height (in cm)	150 – 155	155 – 160	160 – 165	165 – 170	170 – 175	175 – 180
Number of students	15	13	10	8	9	5

The upper limit of the median class in the given data is

(1) 165 (2) 155 (3) 160 (4) 170

2. The LCM of smallest two digit composite number and smallest composite number is

(1) 12 (2) 4 (3) 20 (4) 44

3. For which value(s) of p will the lines represented by the following pair of linear equations be parallel

$3x - y - 5 = 0$; $6x - 2y - p = 0$

(1) all real values except 10

(2) 10

(3) $\frac{5}{2}$

(4) $\frac{1}{2}$

4. If triangle ABC is right angled at C, then the value of sec (A + B) is

(1) 0 (2) 1 (3) $\frac{2}{\sqrt{3}}$ (4) not defined

5. If the difference of Mode and Median of a data is 24, then the difference of median and mean is

(1) 8 (2) 12 (3) 24 (4) 36

6. Two dice are rolled simultaneously. What is the probability that 6 will come up at least once?

(1) $\frac{1}{6}$ (2) $\frac{7}{36}$ (3) $\frac{11}{36}$ (4) $\frac{13}{36}$

7. The point which divides the line segment joining the points (8, –9) and (2, 3) in ratio 1 : 2 internally lies in the

(1) I quadrant (2) II quadrant (3) III quadrant (4) IV quadrant

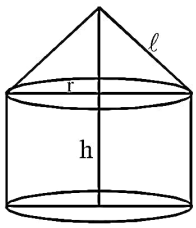
8. The distance of the point P(–3, –4) from the x-axis (in units) is

(1) 3 (2) –3 (3) 4 (4) 5

9. If $A\left(\frac{m}{3},5\right)$ is the mid-point of the line segment joining the points Q(–6, 7) and R(–2, 3), then the value of m is

(1) –12 (2) –4 (3) 12 (4) –6

10. The total surface area of the given solid figure is



(1) $\pi r(2h + \ell)$ (2) $\pi r(\ell + 2h + r)$ (3) $\pi r(\ell + 2h + 2r)$ (4) $\pi r(2h + 2\ell)$

11. If one root of the equation $(k - 1)x^2 - 10x + 3 = 0$ is the reciprocal of the other, then the value of k is _____.

(1) 1 (2) 2 (3) 3 (4) 4

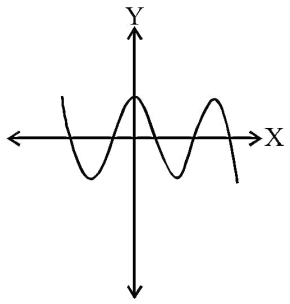
12. Fill the two blanks in the sequence 2,__,26,__ so that the sequence forms an A.P

(1) 14, 38 (2) 16, 40 (3) 12, 36 (4) None of these

13. A number is chosen at random from the numbers –5, –4, –3, –2, –1, 0, 1, 2, 3, 4, 5. Then the probability that square of this number is less than or equal to 1 is

(1) $\frac{1}{11}$ (2) $\frac{2}{11}$ (3) $\frac{3}{11}$ (4) $\frac{4}{11}$

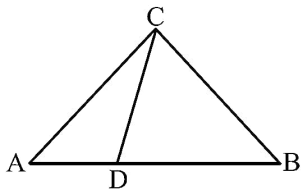
14. The graph of y = p(x), where p(x) is a polynomial in variable x, is as follows.



The number of zeroes of p(x) is

(1) 3 (2) 5 (3) 4 (4) 2

15. In the figure, if $\angle ACB = \angle CDA$, AC = 6 cm and AD = 3 cm, then find the length of AB.



(1) 15 cm (2) 10 cm (3) 12 cm (4) 14 cm

16. If the angle between two tangents drawn from an external point 'P' to a circle of radius 'r' and centre O is 60°, then find the length of OP.

(1) r (2) 2r (3) $\frac{r}{2}$ (4) 3r

17. If the first three terms of an A.P are b, c and 2b, then find the ratio of b and c.

(1) 3 : 2 (2) 2 : 3 (3) 1 : 4 (4) 4 : 1

18. Find the value(s) of k for which the quadratic equation $x^2 + 2\sqrt{2}kx + 18 = 0$ has equal roots.

(1) ±2 (2) ±4 (3) ±3 (4) ±6

19. **Assertion (A) :** If product of two numbers is 5780 and their HCF is 17, then their LCM is 340.

Reason (R) : HCF is always a factor of LCM.

(1) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(2) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

(3) Assertion (A) is true but Reason (R) is false.

(4) Assertion (A) is false but Reason (R) is true.

20. **Assertion (A) :** If a and b are two coprime numbers, then a^3 and b^3 will be coprime numbers.

Reason (R) : Two natural numbers are always coprime numbers then their cubes are also coprime numbers.

(1) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(2) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

(3) Assertion (A) is true but Reason (R) is false.

(4) Assertion (A) is false but Reason (R) is true.

SECTION-B

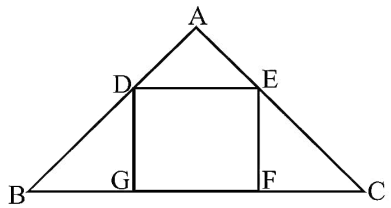
21. Find the number of natural numbers between 102 and 998 which are divisible by 2 and 5 both.

22. Prove that the rectangle circumscribing a circle is a square.

OR

If the radii of two concentric circles are 4 cm and 5 cm, then find the length of chord of one circle which is tangent to the other circle.

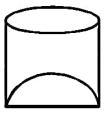
23. In the given figure, DEFG is square and $\angle BAC = 90°$. Show that $FG^2 = BG \times FC$.



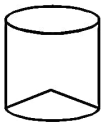
24. Isha is 10 years old girl. On the result day, Isha and her father Suresh were very happy as she got first position in the class. While coming back to their home, Isha asked for a treat from her father as a reward for her success. They went to a juice shop and asked for two glasses of juice.

Aisha, a juice seller, was serving juice to her customers in two types of glasses.

Both the glasses had inner radius 3cm. The height of both the glasses was 10 cm.



First type: A glass with hemispherical raised bottom.



Second type: A glass with conical raised bottom of height 1.5 cm.

Isha insisted to have the juice in first type of glass and her father decided to have the juice in second type of glass. Out of the two, Isha or her father Suresh, who got more quantity of juice to drink and by how much?

25. Jayanti throws a pair of dice and records the product of the numbers appearing on the dice. Pihu throws 1 dice and records the squares of the number that appears on it. Who has the better chance of getting the number 36? Justify?

OR

An integer is chosen between 70 and 100, Find the probability that it is

(i) a prime number (ii) divisible by 7

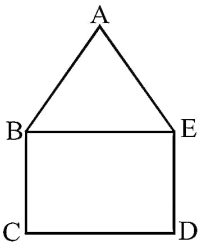
SECTION-C

26. Given that $\sqrt{5}$ is irrational, prove that $2\sqrt{5} - 3$ is an irrational number.

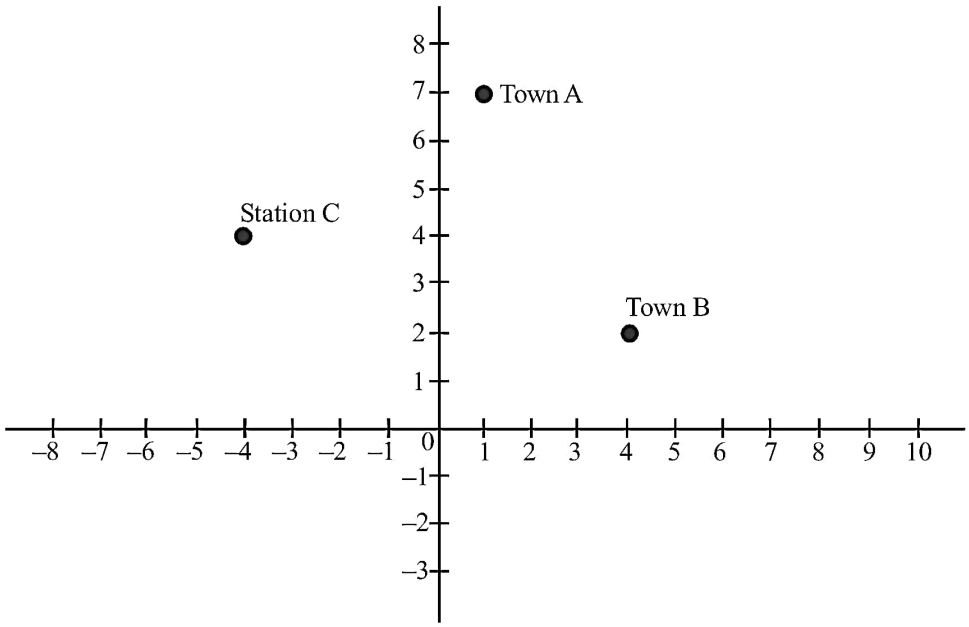
OR

If HCF of 144 and 180 is expressed in the form 13m – 16. Find the value of m.

27. In the figure, ABCDE is a pentagon with BE||CD and BC||DE. BC is perpendicular to CD. AB = 5cm, AE = 5cm, BE = 7cm, BC = x – y and CD = x + y. If the perimeter of ABCDE is 27cm. Find the value of x and y, given x, y ≠ 0.



28. Two friends Seema and Aditya work in the same office at Delhi. In the Christmas vacations, both decided to go to their hometowns represented by Town A and Town B respectively in the figure given below. Town A and Town B are connected by trains from the same station C (in the given figure)in Delhi.Based on the given situation, answer the following questions:



(i) Who will travel more distance, Seema or Aditya, to reach to their hometown?

(ii) Seema and Aditya planned to meet at a location D situated at a point D represented by the mid-point of the line joining the points represented by Town A and Town B. Find the coordinates of the point represented by the point D.

29. If $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$

30. Sides of a right triangular field are 25m, 24m and 7m. At the three corners of the field, a cow, a buffalo and a horse are tied separately with ropes of 3.5 m each to graze in the field. Find the area of the field that cannot be grazed by these animals.

OR

Water is flowing at the rate of 15km/hour through a pipe of diameter 14cm into a cuboidal pond which is 50 m long and 44m wide. In what time will the level of water in the pond rise by 21 cm?

31. Prove the following that :

$$\frac{\tan^3\theta}{1+\tan^2\theta}+\frac{\cot^3\theta}{1+\cot^2\theta} = \sec\theta\ \text{cosec}\theta - 2\ \sin\theta\cos\theta$$

SECTION-D

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

33. A train covers a distance of 360 km at a uniform speed. Had the speed been 5km/hour more, it would have taken 48 minutes less for the journey. Find the original speed of the train.

OR

Solve the following equation : $\frac{1}{x}-\frac{1}{x-2}=3, x\neq 0,2$

34. The angle of elevation of an airplane from a point on the ground is 60°. After a flight of 30 seconds, the angle of elevation becomes 30°. If the airplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the airplane in km/hr.

35. Daily wages of 110 workers, obtained in a survey, are tabulated below:

Daily wages (in ₹)	100 – 120	120 – 140	140 – 160	160 – 180	180 – 200	200 – 220	220 – 240
Number of workers	10	15	20	22	18	12	13

Compute the mean daily wages and modal daily wages of these workers.

OR

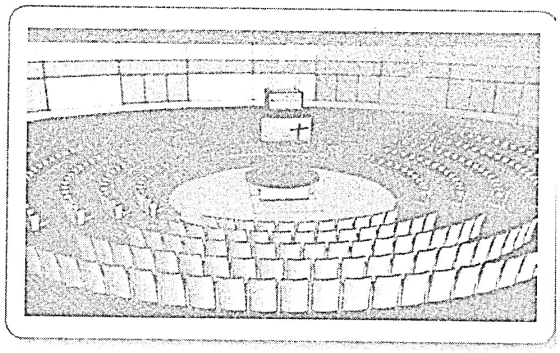
Find the mean of the following frequency distribution :

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80	Below 90	Below 100
Number of students	12	22	35	50	70	86	97	104	109	115

SECTION-E

36. Case Study-1

The school auditorium was to be constructed to accommodate at least 1500 people. The chairs are to be placed in concentric circular arrangement in such a way that each succeeding circular row has 10 seats more than the previous one.



(i) If the first circular row has 30 seats, how many seats will be there in the 10^{th} row?

(ii) For 1500 seats in the auditorium, how many rows need to be there?

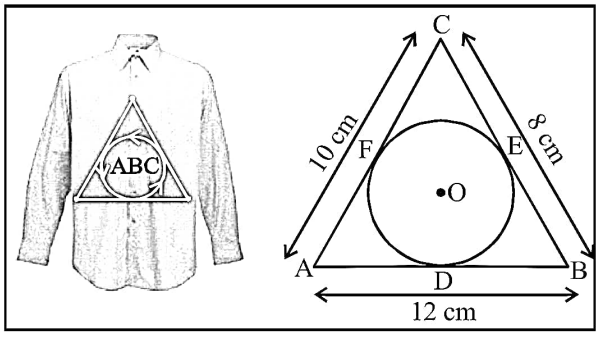
OR

If 1500 seats are to be arranged in the auditorium, how many seats are still left to be put after 10^{th} row?

(iii) If there were 17 rows in the auditorium, how many seats will be there in the middle row?

37. Case Study-2

Varun has been selected by his school to design logo for sports day T-shirts for students and staff. The logo is designed in different geometry and different colours according to the theme. In the given figure, a circle with centre O is inscribed in a ΔABC, such that it touches the sides AB, BC and CA at points D,E and F, respectively. The lengths of sides AB, BC and CA are 12 cm, 8 cm and 10 cm respectively.



(i) Find the length of AD and BE.

(ii) If the radius of the circle is 4 cm, find the area of ΔOAB.

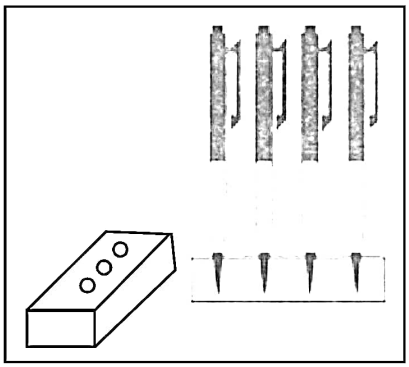
(iii) Calculate the perimeter of ΔABC.

OR

If ΔABC is stitched by Gold wire then calculate the amount required for the same. The rate of gold wire is Rs.1500 per cm.

38. Case Study-3

A carpenter made a wooden pen stand. It is in the shape of cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm. (See figure).



(i) What is the volume of cuboid?

(ii) What is the volume of a conical depression?

(iii) What is the total volume of conical depressions?

OR

What is the volume of wood in the entire stand?