

**Class X Session 2024-25**  
**Subject - Mathematics (Standard)**  
**Sample Question Paper - 1**

**Time Allowed: 3 hours**

**Maximum Marks: 80**

**General Instructions:**

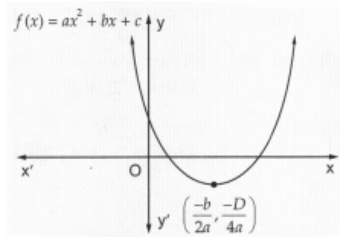
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts 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 2marks questions of Section E
8. Draw neat figures wherever required. Take  $\pi = \frac{22}{7}$  wherever required if not stated.

**Section A**

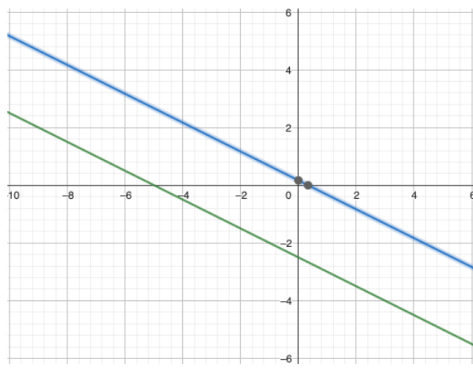
1. (HCF  $\times$  LCM) for the numbers 30 and 70 is: [1]

- |         |        |
|---------|--------|
| a) 21   | b) 70  |
| c) 2100 | d) 210 |

2. Figure show the graph of the polynomial  $f(x) = ax^2 + bx + c$  for which [1]



- |                                  |                                  |
|----------------------------------|----------------------------------|
| a) $a > 0$ , $b < 0$ and $c > 0$ | b) $a < 0$ , $b < 0$ and $c < 0$ |
| c) $a < 0$ , $b > 0$ and $c > 0$ | d) $a > 0$ , $b > 0$ and $c < 0$ |
3. The pair of equations  $x + 2y + 5 = 0$  and  $-3x - 6y + 1 = 0$  have [1]



a) a unique solution

b) infinitely many solutions

c) no solution

d) exactly two solutions

4. In the Maths Olympiad of 2020 at Animal Planet, two representatives from the donkey's side, while solving a quadratic equation, committed the following mistakes. [1]

i. One of them made a mistake in the constant term and got the roots as 5 and 9.

ii. Another one committed an error in the coefficient of  $x$  and he got the roots as 12 and 4.

But in the meantime, they realised that they are wrong and they managed to get it right jointly. Find the quadratic equation.

a)  $2x^2 + 7x - 24 = 0$

b)  $x^2 + 4x + 14 = 0$

c)  $3x^2 - 17x + 52 = 0$

d)  $x^2 - 14x + 48 = 0$

5. What is the common difference of an AP in which  $a_{18} - a_{14} = 32$ ? [1]

a) -8

b) 4

c) -4

d) 8

6. ABCD is a rectangle whose three vertices are B (4,0), C (4,3) and D (0,3). The length of one of its diagonals is [1]

a) 5

b) 3

c) 4

d) 25

7. In what ratio, does x-axis divide the line segment joining the points A(3, 6) and B(-12, -3)? [1]

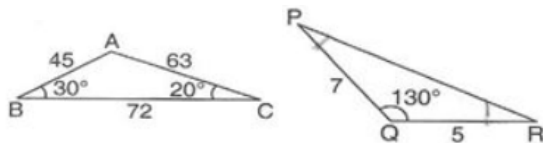
a) 2 : 1

b) 1 : 2

c) 4 : 1

d) 1 : 4

8. In the figures find the measures of  $\angle P$  and  $\angle R$  [1]



a)  $20^\circ, 30^\circ$ .

b)  $50^\circ, 40^\circ$ .

c)  $30^\circ, 20^\circ$ .

d)  $40^\circ, 50^\circ$ .

9. In the given figure, PQ is tangent to the circle centred at O. If  $\angle AOB = 95^\circ$ , then the measure of  $\angle ABQ$  will be [1]



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a)  $\frac{1}{3}$

b)  $\frac{5}{6}$

c)  $\frac{1}{6}$

d)  $\frac{1}{2}$

17. 3 rotten eggs are mixed with 12 good ones. One egg is chosen at random. The probability of choosing a rotten egg is [1]

a)  $\frac{1}{15}$

b)  $\frac{4}{5}$

c)  $\frac{1}{5}$

d)  $\frac{2}{5}$

18. The distribution below gives the marks obtained by 80 students on a test: [1]

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60
Number of Students	3	12	27	57	75	80

The modal class of this distribution is:

a) 30 - 40

b) 20 - 30

c) 50 - 60

d) 10 - 20

19. **Assertion (A):** A piece of cloth is required to completely cover a solid object. The solid object is composed of a hemisphere and a cone surmounted on it. If the common radius is 7 m and height of the cone is 1 m,  $463.39 \text{ cm}^2$  is the area of cloth required. [1]

**Reason (R):** Surface area of hemisphere =  $2\pi r^2$ .

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** Sum of first n terms in an A.P. is given by the formula:  $S_n = 2n \times [2a + (n - 1)d]$  [1]

**Reason (R):** Sum of first 15 terms of 2, 5, 8 ... is 345.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

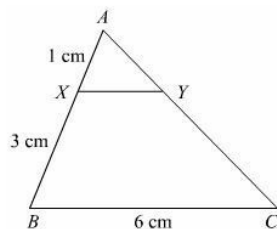
c) A is true but R is false.

d) A is false but R is true.

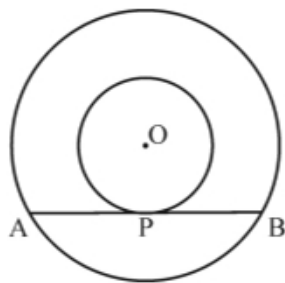
### Section B

21. Find the largest number which divides 320 and 457 leaving remainder 5 and 7 respectively. [2]

22. In the given figure  $XY \parallel BC$ . Find the length of XY. [2]



23. Two concentric circles with centre O are of radii 3 cm and 5 cm. Find the length of chord AB of the larger circle which touches the smaller circle at P. [2]



24. Show that:  $\tan^4 \theta + \tan^2 \theta = \sec^4 \theta - \sec^2 \theta$  for  $0^\circ \leq \theta \leq 90^\circ$  [2]

OR

Prove that:  $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \tan \theta + \cot \theta$

25. Find the length of the arc of a circle of diameter 42 cm which subtends an angle of  $60^\circ$  at the centre. [2]

OR

A horse is tethered to one corner of a rectangular field of dimensions 70 m  $\times$  52 m, by a rope of length 21 m. How much area of the field can it graze?

### Section C

26. Prove that  $3 + \sqrt{5}$  is an irrational number. [3]

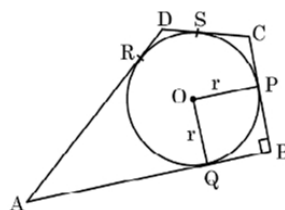
27. If  $\alpha$  and  $\beta$  are the zeros of the polynomial  $f(x) = 6x^2 + x - 2$ , find the value of  $\left(\frac{\alpha}{\beta} + \frac{\beta}{\alpha}\right)$  [3]

28. A two-digit number is 4 times the sum of its digits. If 18 is added to the number, the digits are reversed. Find the number. [3]

OR

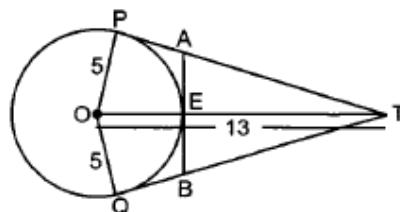
A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time, it had to increase its speed by 100 km/h from the usual speed. Find its usual speed.

29. In the given figure, a circle is inscribed in a quadrilateral ABCD in which  $\angle B = 90^\circ$ . If AD = 17 cm, AB = 20 cm and DS = 3 cm, then find the radius of the circle. [3]



OR

In figure, O is the centre of a circle of radius 5 cm. T is a point such that OT = 13 cm and OT intersects circle at E. If AB is a tangent to the circle at E, find the length of AB. where TP and TQ are two tangents to the circle.



30. Prove that: [3]

$$\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$$

31. The percentage of marks obtained by 100 students in an examination are given below: [3]

Marks	30-35	35-40	40-45	45-50	50-55	55-60	60-65
Frequency	14	16	18	23	18	8	3

Determine the median percentage of marks.

### Section D

32. Solve:  $\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = 2, x \neq -\frac{1}{2}, 1$  [5]

OR

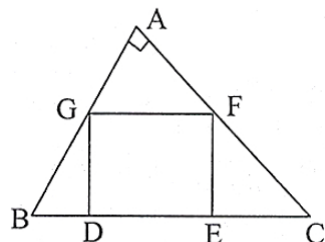
₹ 9000 were divided equally among a certain number of persons. Had there been 20 more persons, each would have got ₹ 160 less. Find the original number of persons.

33. In Fig., DEFG is a square in a triangle ABC right angled at A. [5]

Prove that

i.  $\triangle AGF \sim \triangle DBG$

ii.  $\triangle AGF \sim \triangle EFC$



34. A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 104 cm and the radius of each of the hemispherical ends is 7 cm, find the cost of polishing its surface at the rate of ₹10 per  $\text{dm}^2$ . [5]

OR

A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 19 cm and the diameter of the cylinder is 7 cm. Find the volume and total surface area of the solid (Use  $\pi = 22/7$ )

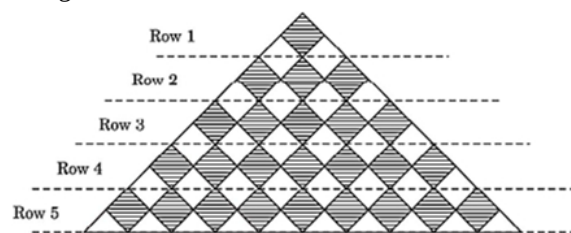
35. Find the mean from the following frequency distribution of marks at a test in statistics: [5]

Marks (x):	5	10	15	20	25	30	35	40	45	50
No. of students (f):	15	50	80	76	72	45	39	9	8	6

### Section E

36. Read the text carefully and answer the questions: [4]

A fashion designer is designing a fabric pattern. In each row, there are some shaded squares and unshaded triangles.



- (a) Identify A.P. for the number of squares in each row.  
 (b) Identify A.P. for the number of triangles in each row.

OR

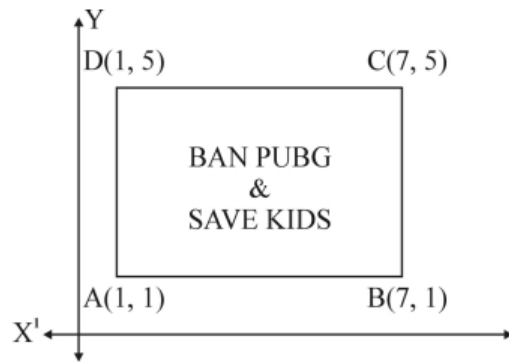
Write a formula for finding total number of triangles in n number of rows. Hence, find  $S_{10}$ .

- (c) If each shaded square is of side 2 cm, then find the shaded area when 15 rows have been designed.

37. Read the text carefully and answer the questions: [4]

Use of mobile screen for long hours makes your eye sight weak and give you headaches. Children who are addicted to play "PUBG" can get easily stressed out. To raise social awareness about ill effects of playing PUBG, a school decided to start 'BAN PUBG' campaign, in which students are asked to prepare campaign board in the shape of a rectangle. One such campaign board made by class X student of the school is shown in

the figure.



- (a) Find the coordinates of the point of intersection of diagonals AC and BD.
- (b) Find the length of the diagonal AC.

**OR**

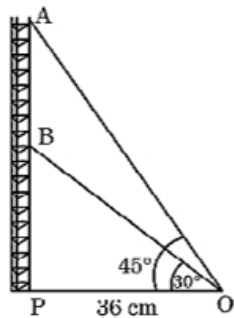
Find the ratio of the length of side AB to the length of the diagonal AC.

- (c) Find the area of the campaign Board ABCD.

38. **Read the text carefully and answer the questions:**

**[4]**

Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure. On a similar concept, a radio station tower was built in two Sections A and B. Tower is supported by wires from a point O. Distance between the base of the tower and point O is 36 cm. From point O, the angle of elevation of the top of the Section B is  $30^\circ$  and the angle of elevation of the top of Section A is  $45^\circ$ .



- (a) Find the length of the wire from the point O to the top of Section B.
- (b) Find the distance AB.

**OR**

Find the height of the Section A from the base of the tower.

- (c) Find the area of  $\triangle OPB$ .