

Class X Session 2023-24
Subject - Mathematics (Standard)
Sample Question Paper - 4

Time Allowed: 3 hours

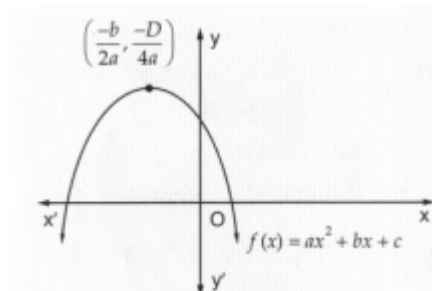
Maximum Marks: 80

General Instructions:

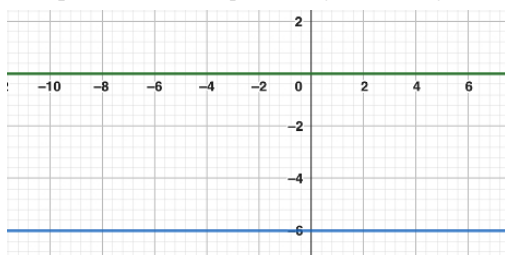
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated 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. The largest number which divides 245 and 1029 leaving remainder 5 in each case is **[1]**
- a) 8 b) 12
- c) 4 d) 16
2. If the diagram in Fig. shows the graph of the polynomial $f(x) = ax^2 + bx + c$, then **[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 linear equations $y = 0$ and $y = -6$ has: **[1]**



a) no solution

b) only solution (0, 0)

c) infinitely many solutions

d) a unique solution

4. 500 bananas were divided equally among a certain number of students. If there were 25 more students, each would have received one banana less. Then the number of students is [1]

a) 500

b) 125

c) 250

d) 100

5. The first and last terms of an A.P. are 1 and 11. If their sum is 36, then the number of terms will be [1]

a) 7

b) 5

c) 8

d) 6

6. The distance of a point from the x-axis is called [1]

a) None of these

b) origin

c) abscissa

d) ordinate

7. The ratio in which the line segment joining $P(x_1, y_1)$ and $Q(x_2, y_2)$ is divided by x-axis is [1]

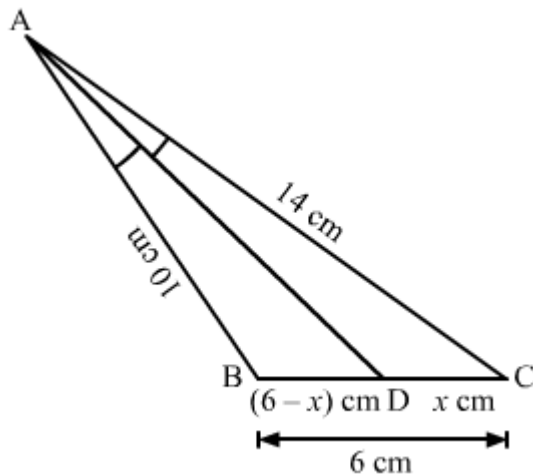
a) $y_1 : y_2$

b) $-y_1 : y_2$

c) $-x_1 : x_2$

d) $x_1 : x_2$

8. In a $\triangle ABC$, it is given that AD is the internal bisector of $\angle A$. If $AB = 10$ cm, $AC = 14$ cm and $BC = 6$ cm, the $CD = ?$ [1]



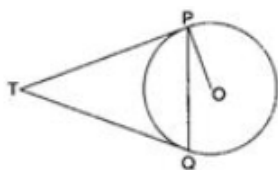
a) 3.5 cm

b) 7 cm

c) 4.8 cm

d) 10.5 cm

9. In the figure, two tangents TP and TQ are drawn to a circle with centre O from an external point T. Then $\angle PTQ =$ [1]



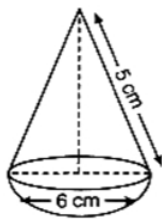
a) $\angle OPQ$

b) $2\angle OPQ$

c) $4\angle OPQ$

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

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Reason (R): The volume hemisphere is given by $\frac{2}{3}\pi r^3$

- 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):** Common difference of the AP -5, -1, 3, 7, ... is 4. [1]

Reason (R): Common difference of the AP a, a + d, a + 2d, ... is given by d = 2nd term - 1st term.

- 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.

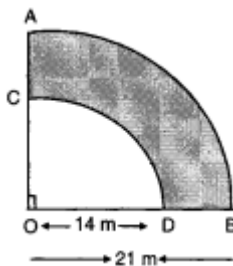
Section B

21. Find the LCM and HCF of the pairs of integers 336 and 54 and verify that $\text{LCM} \times \text{HCF} = \text{product of the two numbers}$. [2]
22. E and F are points on the sides PQ and PR respectively of a $\triangle PQR$. For $PE = 3.9$ cm, $EQ = 3$ cm, $PF = 3.6$ cm and $FR = 2.4$ cm case, state whether $EF \parallel QR$. [2]
23. From a point P, 10 cm away from the centre of a circle, a tangent PT of length 8 cm is drawn. Find the radius of the circle. [2]
24. Simplify: $\frac{\sin 30^\circ + \tan 45^\circ - \text{cosec } 60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}$ [2]

OR

If θ be an acute angle and $5 \text{ cosec } \theta = 7$, then evaluate $\sin \theta + \cos^2 \theta - 1$.

25. ABCD is a flower bed. If $OA = 21$ m and $OC = 14$ m, find the area of the bed. [2]



OR

Find the area of a quadrant of a circle, whose circumference is 22 cm.

Section C

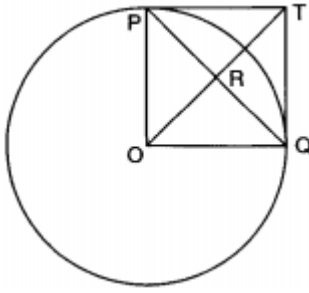
26. Mika exercises every 12 days and Nanu every 8 days. Mika and Nanu both exercised today. How many days will it be until they exercise together again? [3]
27. Find the zeroes of the polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ by factorisation method and verify the relationship between the zeroes and coefficient of the polynomial. [3]
28. Is the pair of linear equation consistent/inconsistent? If consistent, obtain the solution graphically: $x + y = 5$, $2x + 2y = 10$ [3]

OR

If the numerator of a fraction is multiplied by 2 and the denominator is reduced by 5 the fraction becomes $\frac{6}{5}$. And, if

the denominator is doubled and the numerator is increased by 8, the fraction becomes $\frac{2}{5}$. Find the fraction.

29. In figure $PO \perp QO$. The tangents to the circle at P and Q intersect at a point T. Prove that PQ and OT are right bisectors of each other. [3]



OR

A quadrilateral is drawn to circumscribed a circle. Prove that the sum of opposite sides are equal.

30. If $\sin \theta = \frac{12}{13}$, find the value of $\frac{\sin^2 \theta - \cos^2 \theta}{2 \sin \theta \cos \theta} \times \frac{1}{\tan^2 \theta}$. [3]
31. Find the mean of the following frequency distribution: [3]

Class interval	0-6	6-12	12-18	18-24	24-30
Frequency	6	8	10	9	7

Section D

32. If the difference between the radii of the smaller circle and the larger circle is 7 cm and the difference between the areas of the two circles is 1078 sq. cm. Find the radius of the smaller circle. [5]

OR

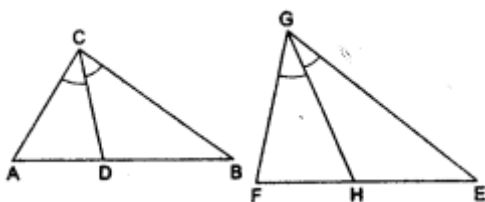
Two pipes running together can fill a tank in $11\frac{1}{9}$ minutes. If one pipe takes 5 minutes more than the other to fill the tank, find the time in which each pipe would fill the tank separately.

33. In the given figure, CD and GH are respectively the bisectors of C and G respectively. If, $\triangle ABC \sim \triangle FEG$, prove that: [5]

a. $\triangle ADC \sim \triangle FHG$

b. $\triangle BCD \sim \triangle EGH$

c. $\frac{CD}{GH} = \frac{AC}{FG}$



34. A spherical glass vessel has a cylindrical neck 8 cm long and 1 cm in radius. The radius of the spherical part is 9 cm. Find the amount of water (in litres) it can hold, when filled completely. [5]

OR

A solid is in the shape of a right-circular cone surmounted on a hemisphere, the radius of each of them is being 3.5 cm and the total height of solid is 9.5 cm. Find the volume of the solid.

35. Compute the median from the following data: [5]

Marks	0 - 7	7 - 14	14 - 21	21 - 28	28 - 35	35 - 42	42 - 49
Number of students	3	4	7	11	0	16	9

Section E

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

Your friend Varun wants to participate in a 200m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds.



- (i) Write first four terms are in AP for the given situations.
- (ii) What is the minimum number of days he needs to practice till his goal is achieved?

OR

Out of 41, 30, 37 and 39 which term is not in the AP of the above given situation?

- (iii) How many second takes after 5th days?

37. Read the text carefully and answer the questions:

[4]

Using Cartesian Coordinates we mark a point on a graph by how far along and how far up it is.

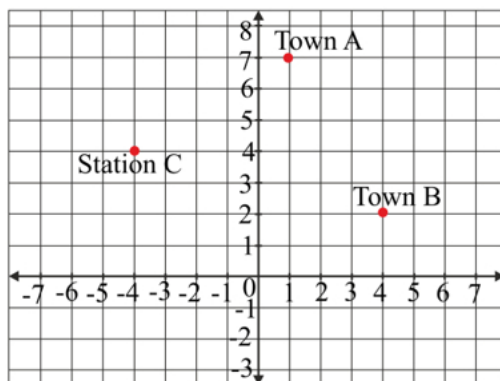
The left-right (horizontal) direction is commonly called X-axis.

The up-down (vertical) direction is commonly called Y-axis.

When we include negative values, the x and y axes divide the space up into 4 pieces.

Read the information given above and below:

Two friends Veena and Arun work in the same office in Delhi. In the Christmas vacations, both decided to go 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.



- (i) Who will travel more distance to reach their home?
- (ii) Find the location of the station.

OR

Find the distance between Town A and Town B.

- (iii) Find in which ratio Y-axis divide Town B and Station.

38. Read the text carefully and answer the questions:

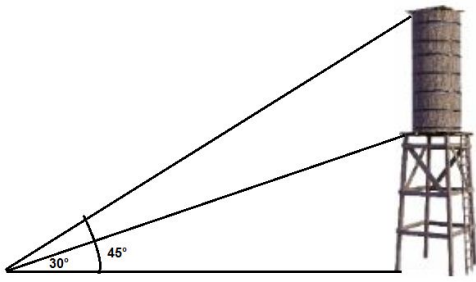
[4]

In a society, there are many multistory buildings. The RWA of the society wants to install a tower and a water tank so that all the households can get water without using water pumps.

For this they have measured the height of the tallest building in the society and now they want to install a tower that will be taller than that so that the level of water must be higher than the tallest building in their society. Here is one solution they have found and now they want to check if it will work or not.

From a point on the ground 40 m away from the foot of a tower, the angle of elevation of the top of the tower is

300. the angle of elevation of the top of the water tank is 45° .



- (i) What is the height of the tower?
- (ii) What is the height of the water tank?

OR

What will be the angle of elevation of the top of the water tank from the place at $\frac{40}{\sqrt{3}}$ m from the bottom of the tower.

- (iii) At what distance from the bottom of the tower the angle of elevation of the top of the tower is 45° .