

Sample Question Paper - 12
Mathematics-Standard (041)
Class- X, Session: 2021-22
TERM II

Time Allowed: 2 hours

Maximum Marks: 40

General Instructions:

1. The question paper consists of 14 questions divided into 3 sections A, B, C.
2. All questions are compulsory.
3. Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
4. Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
5. Section C comprises of 4 questions of 4 marks each. An internal choice has been provided in one question. It contains two case study-based questions.

Section A

1. In an AP, the first term is 2, the last term is 29 and the sum of all the terms is 155. Find the common difference. [2]
2. Solve: $\frac{x+3}{x+2} = \frac{3x-7}{2x-3}$ [2]
3. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that $AB + CD = AD + BC$ [2]
4. Two cubes each of 10 cm edge are joined end to end. find the surface area of the resulting cuboid. [2]
5. The arithmetic mean of the following data is 25, find the value of k. [2]

x_i	5	15	25	35	45
f_i	3	k	3	6	2

6. If the equation $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$. [2]

OR

Solve the quadratic equation by factorization:

$$x^2 + 2ab = (2a + b)x$$

Section B

7. Compute the median for each of the following data: [3]

Marks	No. of students
Less than 10	0
Less than 30	10
Less than 50	25

Less than 70	43
Less than 90	65
Less than 110	87
Less than 130	96
Less than 150	100

8. Construct tangents to a circle of radius 3 cm from a point on concentric circle of radius 5 cm and measure its length. [3]

9. If the mean of the following frequency distribution is 18, find the missing frequency. [3]

Class interval	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency	3	6	9	13	f	5	4

10. If the angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary, find the height of the tower. [3]

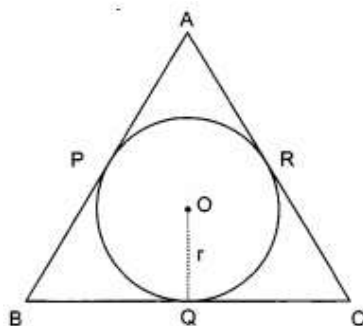
OR

Two ships are there in the sea on either side of a lighthouse in such a way that the ships and the lighthouse are in the same straight line. The angles of depression of two ships are observed from the top of the lighthouse are 60° and 45° respectively. If the height of the lighthouse is 200 m, find the distance between the two ships. (Use $\sqrt{3} = 1.73$)

Section C

11. A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in his field, which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/hr, in how much time will the tank be filled ? [4]

12. In figure the sides AB, BC and CA of triangle ABC touch a circle with centre O and radius r at P, Q and R respectively. [4]



Prove that:

i. $AB + CQ = AC + BQ$

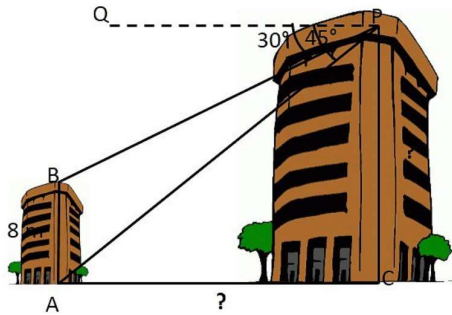
ii. $Area(\Delta ABC) = \frac{1}{2}(\text{Perimeter of } \Delta ABC) \times r$

OR

A is a point at a distance 13 cm from the centre 'O' of a circle of radius 5 cm. AP and AQ are the tangents to circle at P and Q. If a tangent BC is drawn at point R lying on minor arc PQ to intersect AP at B AQ at C. Find the perimeter of ΔABC .

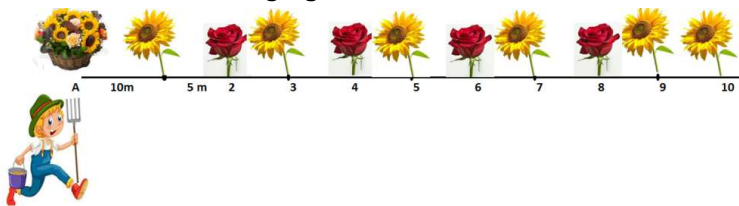
13. Basant and Vinod lives in a housing society in Dwarka, New Delhi. There are two building in their housing society. The first building is 8 meter tall. One day, both of them were just trying [4]

to guess the height of the other multi-storeyed building. Vinod said that it might be a 45 degree angle from the bottom of our building to the top of multi-storeyed building so the height of the building and distance from our building to this multi-storeyed building will be same. Then, both of them decided to estimate it using some trigonometric tools. Let's assume that the first angles of depression of the top and bottom of an 8 m tall building from top of a multi-storeyed building are 30° and 45° , respectively.



- i. Now help Vinod and Basant to find the height of the multi-storeyed building.
- ii. Also, find the distance between two buildings.

14. In a school garden, Dinesh was given two types of plants viz. sunflower and rose flower as shown in the following figure. [4]



The distance between two plants is to be 5m, a basket filled with plants is kept at point A which is 10 m from the first plant. Dinesh has to take one plant from the basket and then he will have to plant it in a row as shown in the figure and then he has to return to the basket to collect another plant. He continues in the same way until all the flower plants in the basket. Dinesh has to plant ten numbers of flower plants.

Now answer the following questions:

- i. Find the distance covered by Dinesh to plant the first 5 plants and return to basket. (2)
- ii. Find the distance covered by Dinesh to plant all 10 plants and return to basket. (1)
- iii. If the speed of Dinesh is 10 m/min and he takes 15 minutes to plant a flower plant then find the total time taken by Dinesh to plant 10 plants. (1)

Target Mathematics by Dr. Agyat Gupta

