Pratap Public School, Karnal
Pre-Board Examination - 2021-2022
Class - X
Subject - Mathematics

M.M : 40

Time : 2 Hours

Name .... Roll No. .... Section ....
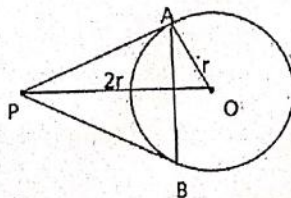
General Instructions:-

1. The question paper consists of 14 questions divided into 3 sections A, B and 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   (6×2=12)

1. From a point P, two tangents PA and PB are drawn to a circle C(0, r). If OP = 2r, then find ∠APB. What type of triangle is APB?

2. Find the three numbers in A.P whose sum is 21 and the product of last two terms is 63.

OR

The first term of an A.P is 5, the last term is 45 and the sum is 400. Find the number of terms and common difference.

3. Find the value of k for which the quadratic equation $(k + 4)x^2 + (k + 1)x + 1 = 0$ has equal roots.

4. A solid iron in the form of cuboid of dimensions 49cm × 33cm × 24cm is melted to form solid sphere. Find the radius of the sphere.

5. The following data gives information on the observed lifetimes (in hours) of 225 electrical components:

Life times (in hours)	Frequency
0 – 20	10
20 – 40	35
40 – 60	52
60 – 80	61
80 – 100	38
100 – 120	29

Determine the modal lifetimes of the components.

6. Solve the following quadratic equation for x

$$4x^2 + 4bx - (a^2 - b^2) = 0$$

OR

The sum of squares of two consecutive natural numbers is 313. Find the numbers.

Section B   **(4×3=12)**

7. The median of the following data is 50. Find the values of 'p' and 'q', if the sum of all the frequencies is 90.

MARKS	20 - 30	30 – 40	40 - 50	50 - 60	60 – 70	70 - 80	80 - 90
FREQUENCY	p	15	25	20	q	8	10

8. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

9. The table below shows the daily expenditure on food of 25 households in a locality.

Daily Expenditure (in ₹)	100 - 150	150 - 200	200 - 250	250 - 300	300 - 350
Number of households	4	5	12	2	2

Find the mean daily expenditure on food by a suitable method.

10. At a point A, 20 metres above the level of water in a lake, the angle of elevation of a cloud is 30°. The angle of depression of the reflection of the cloud in the lake, at A is 60°. Find the distance of the cloud from point A.
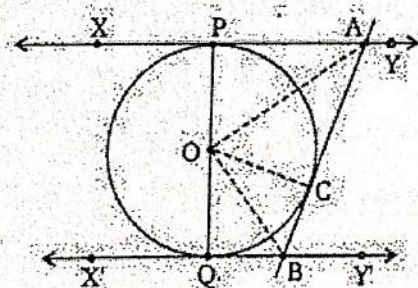
OR

The angle of elevation of the top of a building from the foot of a tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high, find the height of the building.
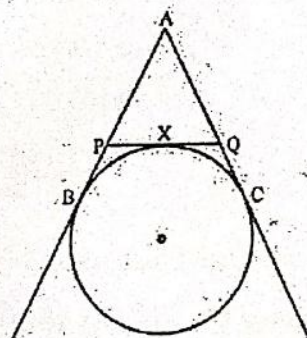
Section C   (4×4=16)

11. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.

12. In figure, XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that ∠AOB = 90°.

OR
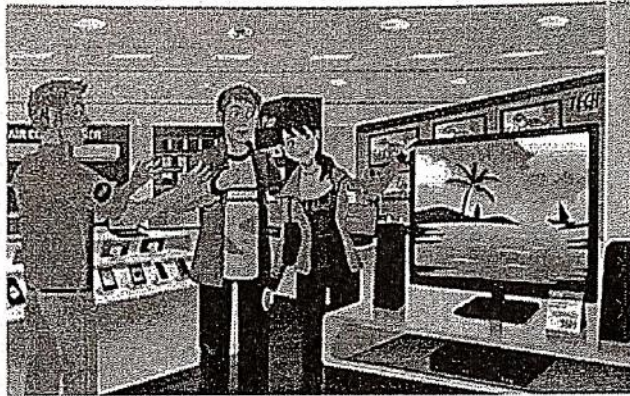
If AB, AC, PQ are the tangents in the figure, and AB = 5 cm, find the perimeter of ΔAPQ.

13.

Case Study-1

During the summers of 2003, Manisha thought of starting some business of her own and lent some money from her father and started a TV manufacturing company. After some years, she was known as one of the leading manufacturers in her area and kept expanding her limit year by year. Assuming that the production increases uniformly year by year, the number of TV sets produced by her in the third year was 600 units and in the seventh year was 700 units.
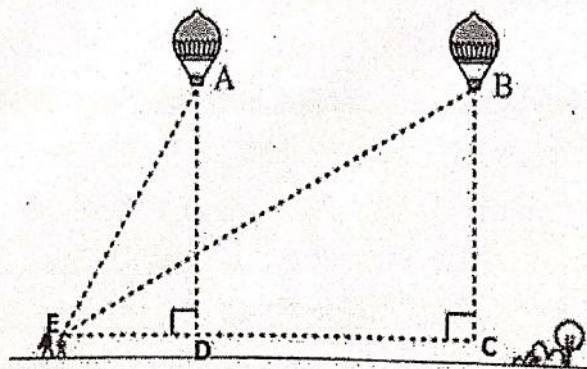

Keeping the above situation in mind, answer the following questions:

(i) Form an A.P representing the production of TV sets. Also find the production in tenth year.

(ii) What was the total production till seven years?

14.

Case Study-2

On a hot sunny day, a hot air balloon is flying in the air. Sushma happens to spot the balloon in the sky and runs to her mother to tell her about it. Her mother rushes out of the house to

look at the balloon. When Sushma had spotted the balloon, initially it was at point A. When both the mother and daughter came out to see it, it had already travelled to another point B. Given that, Sushma is 1.2 m tall and height of balloon from the ground is 88.2 m, $\angle AED = 60°$ and $\angle BEC = 30°$. Keeping the above situation in mind, answer the following questions:

(i) Find the length AE.

(ii) Find the distance travelled by the balloon.

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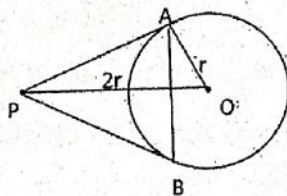
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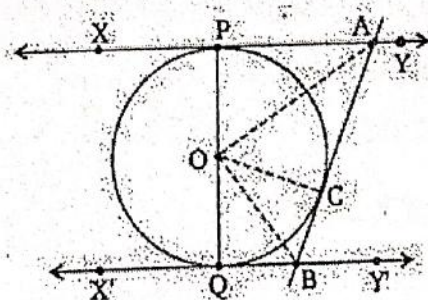
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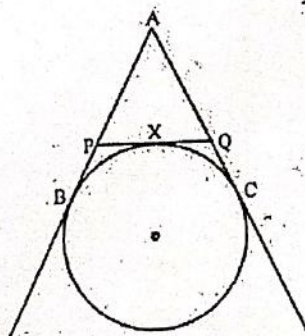<div align="center">

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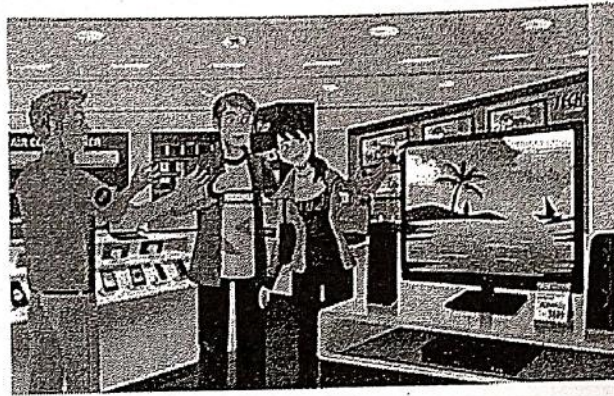

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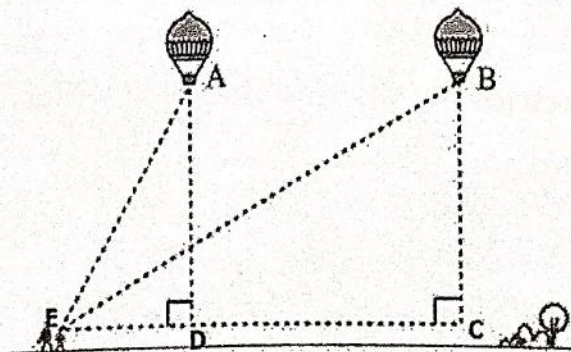

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