

MAHARAJA AGGARSAIN ADARSH PUBLIC SCHOOL
PRE-BOARD TERM II EXAMINATION(2021 – 22)

Class – X

Subject: Mathematics Standard(041)

M. M. : 40

Time: 2 hours

General Instructions:-

- The question paper consists of 14 questions divided into 3 sections A, B, C.
- All questions are compulsory.
- Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
- Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
- 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

Q.1 The sum of three numbers in A.P. is 3 and their product is -35. Find the numbers

OR

Find the first and second negative terms of the A.P. 18, 16, 14,

Q.2 Find the value of k so that the quadratic equation $kx(3x - 10) + 25$, has two equal roots.

Q.3 From a point Q, the length of tangent segment to a circle is 24 cm and the distance of Q from the centre is 25 cm. Find the radius of the circle.

Q.4 A spherical shell of iron with external diameter 9cm is melted and recast into a conical solid 28cm in diameter and $4\frac{3}{7}$ cm height. Find the inner radius of the shell.

Q.5 Find the mode of the following frequency distribution of marks obtained by 50 students.

| | | | | | |
|-----------------|------|-------|-------|-------|-------|
| Marks obtained | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| No. of students | 5 | 12 | 20 | 10 | 3 |

Q.6 If Suman was younger by 5 years than what she really is, then the square of her age (in years) would have been 11 more than 5 times her actual age. What is her age now?

OR

Solve for x:- $4x^2 + 4bx - (a^2 - b^2) = 0$.

SECTION B

Q.7 The median for the following frequency distribution is 28.5, find the values of x and y if $\sum f_i = 60$

| | | | | | | |
|-----------------|------|-------|-------|-------|-------|-------|
| Class intervals | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
| Frequency (f) | 5 | x | 20 | 15 | y | 5 |

Q.8 Draw a circle of radius 4 cm. From the point 7 cm away from its centre, construct the pair of tangents to the circle.

Q.9 Calculate the mean for the following frequency distribution:

| Marks | Less than 20 | Less than 30 | Less than 40 | Less than 50 | Less than 60 | Less than 70 |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|
| Frequency | 3 | 10 | 20 | 26 | 34 | 40 |

Q.10 A pole 6m high is fixed on the top of a tower. The angle of elevation of the top of the pole from a point P on the ground is 60° and the angle of depression of the point P from the top of the tower is 45° . Find the height of the tower.

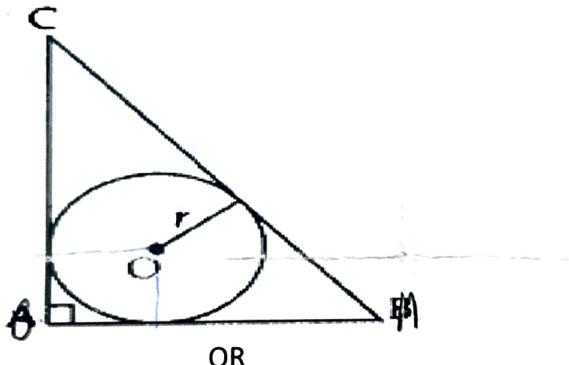
OR

From a point on the ground, the angles of elevation of the bottom and the top of a tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

SECTION C

Q.11 A vessel is in the form of an inverted cone. Its height is 11 cm and radius of its top which is open, is 2.5 cm. It is filled to the rim. When some spherical lead shots, each of radius 0.25 cm are dropped into the vessel, $\frac{2}{5}$ of the water flows out. Find the number of lead shots dropped in the vessel.

Q.12 In Figure, a right triangle ABC, circumscribes a circle of radius r . If AB and BC are of lengths 8 cm and 6 cm respectively, find the value of r .



OR

A circle is touching the side BC of $\triangle ABC$ at X and touching AB and AC produced at P and Q respectively.

Prove that $AP = AQ = \frac{1}{2}(\text{Perimeter of } \triangle ABC)$. Given $AP = 10 \text{ cm}$, find the perimeter of $\triangle ABC$.

CASE STUDY QUESTIONS

Q.13 Two lamp-posts are of equal height. A boy measured the elevation of the top of each lamp-post from the mid-point of the line-segment joining the feet of lamp-post as 30° . After walking 15 m towards one of them, he measured the elevation of the top of nearest lamp-post at the point where he stands as 60° .

1. Make a labelled figure on the basis of the given information and determine the height of each lamp-post.
2. Find the distance between the two lamp-posts.

Q.14 The students of a school decided to beautify the school on the Annual Day by fixing colourful flags on the straight passage of the school. They have 27 flags to be fixed at intervals of every 2 m. The flags are stored at the position of the middle most flag. Ruchi was given the responsibility of placing the flags. Ruchi kept her books where the flags were stored. She could carry only one flag at a time.

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

1. Form an AP for the given information. How much distance did she cover in completing this job and returning back to collect her books?
2. What is the maximum distance she travelled carrying a flag?