



**PRACTICE PAPER- 4**  
**Mathematics-Basic (241)**  
**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. Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
3. Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
4. 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. Find whether the equation has real roots. If real roots exist, find them:  $5x^2 - 2x - 10 = 0$  [2]

OR

Find the nature of the roots of the following quadratic equation. If the real roots exist, find them:  
 $3x^2 - 4\sqrt{3}x + 4 = 0$

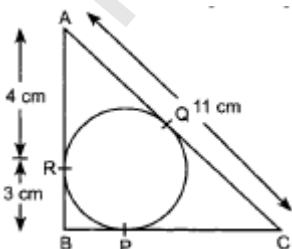
2. The radii of the bases of a cylinder and a cone are in the ratio 3 : 4 and their heights are in the ratio 2 : 3. What is the ratio of their volumes? [2]
3. Calculate the mean of the following data, using direct method: [2]

Class	25 - 35	35 - 45	45 - 55	55 - 65	65 - 75
Frequency	6	10	8	12	4

4. Is 12, 2, - 8, -18, ... an arithmetic progression. If yes, find out the common difference. [2]
5. Find the mode of the following frequency distribution: [2]

Class	0 - 20	20 - 40	40 - 60	60 - 80	80 -100
Frequency	25	16	28	20	5

6. In figure,  $\triangle ABC$  is circumscribing a circle. Find the length of BC. [2]



OR

Let A be the one of the points of intersection of two intersecting circles with centres O and Q. The

tangents at A to the two circles meet the circles again at B and C, respectively. Let the point P be located so that OPAQ is a parallelogram. Prove that P is the circumcentre of the triangle ABC.

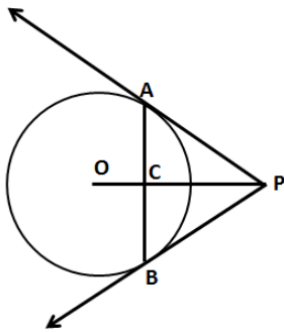
### Section B

7. If  $a_n = 3 - 4n$ , show that  $a_1, a_2, a_3, \dots$  form an A.P. Also find  $S_{20}$ . [3]
8. The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is  $30^\circ$ , than when it is  $60^\circ$ . Find the height of the tower. [3]

OR

The pilot of an aircraft flying horizontally at a speed of 1200 km/hr. observes that the angle of depression of a point on the ground changes from  $30^\circ$  to  $45^\circ$  in 15 seconds. Find the height at which the aircraft is flying.

9. From a point P outside a circle with centre O, tangents PA and PB are drawn to the circle. Prove that OP is the right bisector of the line segment AB. [3]



10. Find the values of p for which the quadratic equation  $(2p + 1)x^2 - (7p + 2)x + (7p - 3) = 0$  has real and equal roots. [3]

### Section C

11. Draw two concentric circles of radii 4 cm and 6 cm. Construct a tangent to the smaller circle from a point on the larger circle. Measure the length of this tangent. [4]

OR

Construct tangents to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm.

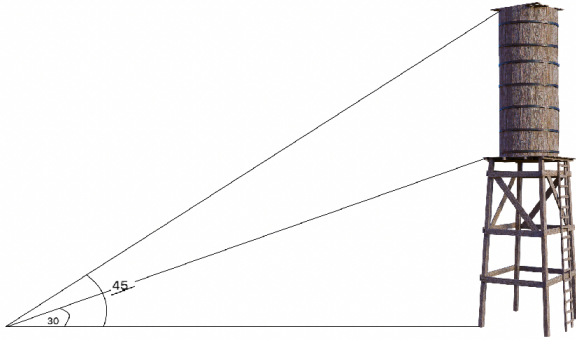
12. Calculate the mode of the following frequency distribution table : [4]

Marks	Number of students
25 or more than 25	52
35 or more than 35	47
45 or more than 45	37
55 or more than 55	17
65 or more than 65	8
75 or more than 75	2
85 or more than 85	0

13. In a society, there are many multistorey buildings. The RWA of the society wants to install a tower and a watertank so that all the households can get water without using water pumps. For this they have measured the height of the tallest building in their society and now they want to install a tower that will be taller than that so that the level of water must be higher [4]

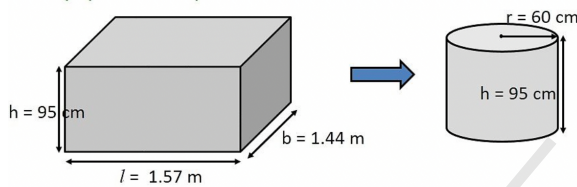
than the tallest building in their society. Here is one solution they have found and now they want to check if it will work or not.

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  $30^\circ$ . the angle of elevation of the top of a water tank (on the top of the tower) is  $45^\circ$ .



- Find the height of the tower.
- Find the depth of the tank.

14. Selvi's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from a sump (underground tank). Which is in the shape of a cuboid. The sump has dimensions  $1.57\text{m} \times 1.44\text{m} \times 0.95\text{m}$ . The overhead tank has its radius of 60 cm and its height is 95 cm. [4]



- Find the height of the water, left in the sump after the overhead tank has been completely filled with water from a sump which had been full.
- Compare the capacity of the tank with that of the sump. (Use  $\pi = 3.14$ ).