



INDIAN SCHOOL MUSCAT
SECOND PRE-BOARD EXAMINATION
TERM 2
MATHEMATICS (041)

CLASS: X

30.03.2022

Time Allotted: 2 hrs

Max. 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 Find the nature of roots of the quadratic equation $2x^2 - 4x + 3 = 0$. 2

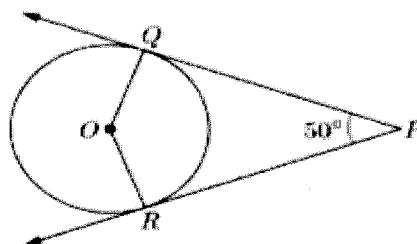
ORFind the roots of the quadratic equation $6x^2 - x - 2 = 0$.

- 2 A cubical ice-cream brick of edge 22 cm is to be distributed among some children by filling ice-cream cones of radius 2 cm and height 7 cm up to its brim. How many children will get the ice-cream cones? 2

OR

A hemispherical tank, of diameter 3 m, is full of water. It is being emptied by a pipe at the rate of $3\frac{4}{7}$ litres per second. How much time will it take to make the tank half empty?
 (Use $\pi = \frac{22}{7}$)

- 3 In the given figure, PQ and PR are tangents to the circle with centre O, such that $\angle QPR = 50^\circ$, then find $\angle OQR$. 2



- 4 Find the value of k for which the roots of the quadratic equation $2x^2 + kx + 8 = 0$ will have the equal roots. 2

- 5 In a class test, 50 students obtained marks are as follows. Find the modal class and the median class. 2

Marks	0-20	20-40	40-60	60-80	80-100
Number	4	6	25	10	5

- 6 In an A.P, if the common difference $d = -4$ and the 7th term is 4, then find the first term. 2

SECTION-B

- 7 Find the value of p if the mean of the following distribution is 7.5 3

x_i	3	5	7	9	11	13
f_i	6	8	15	p	8	4

- 8 Draw a line segment of length 10 cm. Draw a circle of radius 5 cm at one end point of the line segment and a circle of radius 3 cm at other end. Construct tangents to each circle from the centre of the other circle. 3

- 9 Weekly income of 600 families is given below. Find the median. 3

Income	Frequency
0-1000	250
1000-2000	190
2000-3000	100
3000-4000	40
4000-5000	15
5000-6000	5

- 10 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 a tower from the foot of the building is 60° . If the tower is 60 m high, then find the height of the building. 3

OR

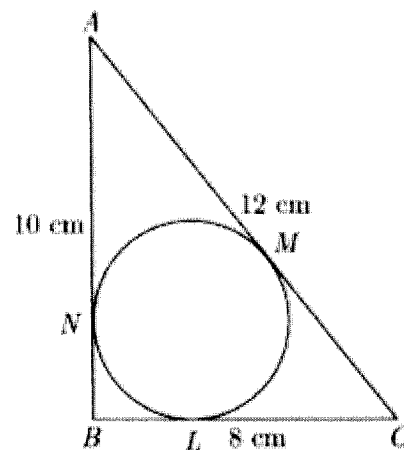
From the top of a tower 50 m high, the angle of depression of the top of a pole is 45° and from the foot of the pole, the angle of elevation of the top of the tower is 60° . Find the approximate height of the pole, if the pole and tower stand on the same plane. (Use $\sqrt{3} = 1.732$)

SECTION-C

- 11 A right $\triangle ABC$, right angled at A is circumscribing a circle. If $AB = 6\text{ cm}$ and $BC = 10\text{ cm}$, find the radius of the circle 4

OR

In Figure, a circle is inscribed in a $\triangle ABC$ having sides $BC = 8\text{ cm}$, $AB = 10\text{ cm}$ and $AC = 12\text{ cm}$. Find the length BL, CM and AN.



- 12 From a solid cylinder of height 20 cm and diameter 12 cm, a conical cavity of height 8 cm and radius 6 cm is hollowed out. Find the total surface area of the remaining solid. (Use $\pi = \frac{22}{7}$) 4

CASE STUDY QUESTIONS

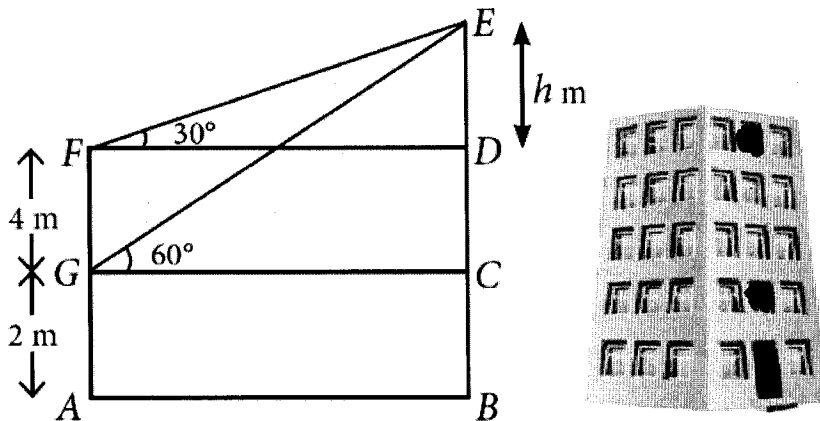
- 13 Anita's mother starts a new shoe shop. To display the shoes, she put 3 pairs of shoes in 1st row, 5 pairs in 2nd row, 7 pairs in 3rd row and so on. 4



Based on above information, answer the following questions.

- If she puts a total of 120 pairs of shoes, then find the number of rows required.
- What is the difference of pairs of shoes in 17th row and 10th row

- 14 There are two windows in a house. First window is at the height of 2 m above the ground and other window is 4 m vertically above the lower window. Ankit and Radha are sitting inside the two windows at points G and F respectively. 4



At an instant, the angles of elevation of a balloon from these windows are observed to be 60° and 30° as shown below. Based on the above information, answer the following questions.

- Find the value of h .
- What is the height of the balloon from the ground?

End of the Question Paper



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SECTION-A

- 1 Find the sum of first 20 terms of the A.P 1, 4, 7, 10, 2

- 2 In a class test, 50 students obtained marks are as follows. Find the modal class and the median class. 2

Marks	0-20	20-40	40-60	60-80	80-100
Number	4	6	25	10	5

- 3 Find the value of k for which the roots of the quadratic equation $2x^2 + kx + 8 = 0$ will have the equal roots. 2

- 4 A hemispherical tank, of diameter 3 m, is full of water. It is being emptied by a pipe at the rate of $3\frac{4}{7}$ litres per second. How much time will it take to make the tank half empty? 2
 (Use $\pi = \frac{22}{7}$)

OR

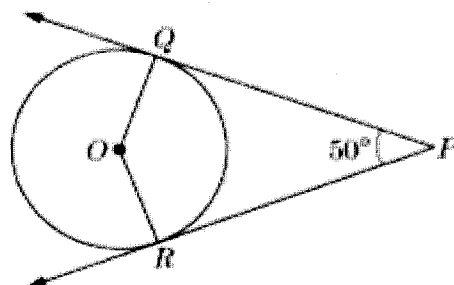
A cubical ice-cream brick of edge 22 cm is to be distributed among some children by filling ice-cream cones of radius 2 cm and height 7 cm up to its brim. How many children will get the ice-cream cones?

- 5 Find the nature of roots of the quadratic equation $2x^2 - 4x + 3 = 0$. 2

OR

Find the roots of the quadratic equation $6x^2 - x - 2 = 0$.

- 6 In the given figure, PQ and PR are tangents to the circle with centre O, such that $\angle QPR = 50^\circ$, then find $\angle OQR$.



2

SECTION-B

- 7 From the top of a tower 50 m high, the angle of depression of the top of a pole is 45° and from the foot of the pole, the angle of elevation of the top of the tower is 60° . Find the approximate height of the pole, if the pole and tower stand on the same plane. (Use $\sqrt{3} = 1.732$)

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 a tower from the foot of the building is 60° . If the tower is 60 m high, then find the height of the building.

- 8 Weekly income of 600 families is given below. Find the median.

3

Income	Frequency
0-1000	250
1000-2000	190
2000-3000	100
3000-4000	40
4000-5000	15
5000-6000	5

- 9 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.

3

- 10 Find the value of p, if the mean of the following distribution is 7.5.

3

xi	3	5	7	9	11	13
fi	6	8	15	p	8	4

SECTION-C

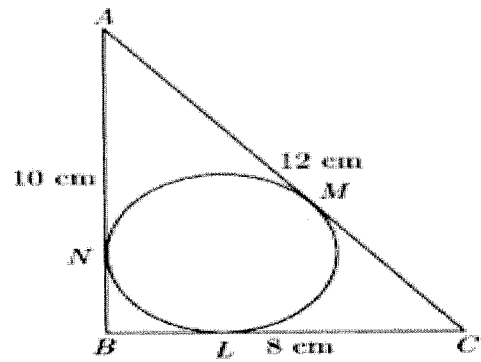
- 11 A solid is in the shape of a cone surmounted on a hemisphere, the radius of each of them being 3.5 cm and the total height of solid is 9.5 cm. Find the volume of the solid. (Use $\pi = \frac{22}{7}$)
- 12 A right $\triangle ABC$, right angled at A is circumscribing a circle. If $AB = 6\text{ cm}$ and $BC = 10\text{ cm}$, find the radius of the circle

4

4

OR

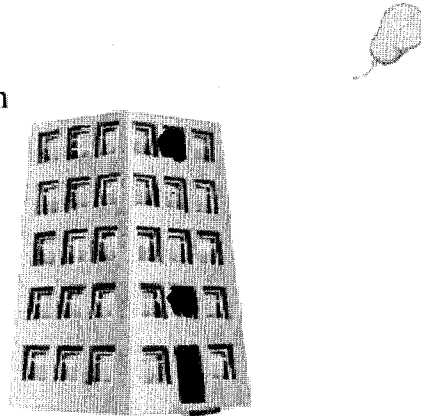
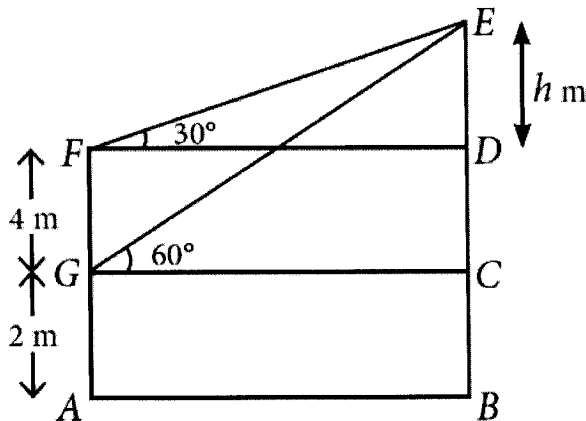
In Figure, a circle is inscribed in a $\triangle ABC$ having sides $BC = 8\text{cm}$, $AB = 10\text{cm}$ and $AC = 12\text{cm}$. Find the length BL , CM and AN .



CASE STUDY QUESTIONS

- 13 There are two windows in a house. First window is at the height of 2 m above the ground and other window is 4 m vertically above the lower window. Ankit and Radha are sitting inside the two windows at points G and F respectively.

4



At an instant, the angles of elevation of a balloon from these windows are observed to be 60° and 30° as shown below. Based on the above information, answer the following questions.

- Find the value of h .
- What is the height of the balloon from the ground?

- 14 Anita's mother starts a new shoe shop. To display the shoes, she put 3 pairs of shoes in 1st row, 5 pairs in 2nd row, 7 pairs in 3rd row and so on.

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Based on above information, answer the following questions.

- If she puts a total of 120 pairs of shoes, then find the number of rows required.
- What is the difference of pairs of shoes in 17th row and 10th row

End of the Question Paper



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SECTION-A

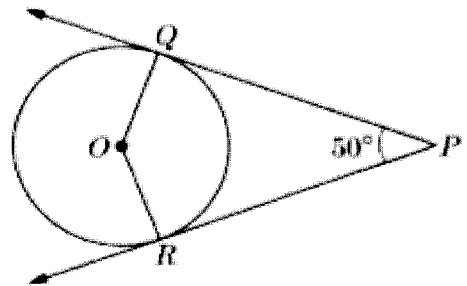
- 1 Find the value of k for which the roots of the quadratic equation $2x^2 + kx + 6 = 0$ will have the equal roots. 2

- 2 In a class test, 40 students obtained marks are as follows. Find the modal class and the median class. 2

Marks	0-20	20-40	40-60	60-80	80-100
Number	4	6	20	6	4

- 3 Find the number of terms in an A.P, if $a = 1$, $a_n = 20$ and $S_n = 399$. 2

- 4 In the given figure, PQ and PR are tangents to the circle with centre O, such that $\angle QPR = 50^\circ$, then find $\angle OQR$. 2



- 5 A cubical ice-cream brick of edge 22 cm is to be distributed among some children by filling ice-cream cones of radius 2 cm and height 7 cm up to its brim. How many children will get the ice-cream cones? 2

OR

A hemispherical tank, of diameter 3 m, is full of water. It is being emptied by a pipe at the rate of $3\frac{4}{7}$ litres per second. How much time will it take to make the tank half empty?
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- 6 Find the nature of roots of the quadratic equation $2x^2 - 4x + 3 = 0$. 2

OR

Find the roots of the quadratic equation $6x^2 - x - 2 = 0$.

SECTION-B

- 7 Weekly income of 600 families is given below. Find the median.

Income	Frequency
0-1000	250
1000-2000	190
2000-3000	100
3000-4000	40
4000-5000	15
5000-6000	5

- 8 From the top of a vertical tower, the angles of depression of two cars, in the same straight line with the base of the tower, at an instant are found to be 45° and 60° . If the cars are 100 m apart and are on the same side of the tower, find the height of the tower.
(Use $\sqrt{3} = 1.73$)

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 a tower from the foot of the building is 60° . If the tower is 60 m high, then find the height of the building.

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xi	3	5	7	9	11	13
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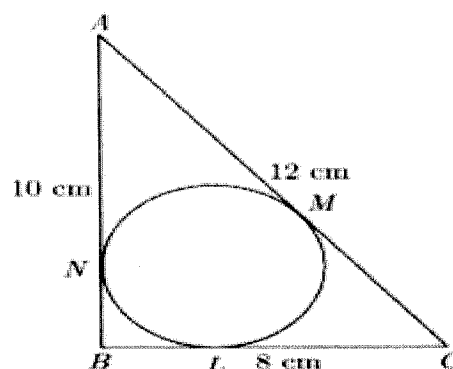
- 10 Draw a line segment of length 9 cm. Draw a circle of radius 5 cm at one end point of the line segment and a circle of radius 3 cm at other end. Construct tangents to each circle from the centre of the other circle.

SECTION-C

- 11 A right $\triangle ABC$, right angled at A is circumscribing a circle. If $AB = 6\text{ cm}$ and $BC = 10\text{ cm}$, find the radius of the circle

OR

In Figure, a circle is inscribed in a $\triangle ABC$ having sides $BC = 8\text{ cm}$, $AB = 10\text{ cm}$ and $AC = 12\text{ cm}$. Find the length BL, CM and AN.



- 12 A 21 m deep well with diameter 6 m is dug and the earth from digging is evenly spread to form a platform $27\text{ m} \times 11\text{ m}$. Find the height of the platform. (Use $\pi = \frac{22}{7}$)

CASE STUDY QUESTIONS

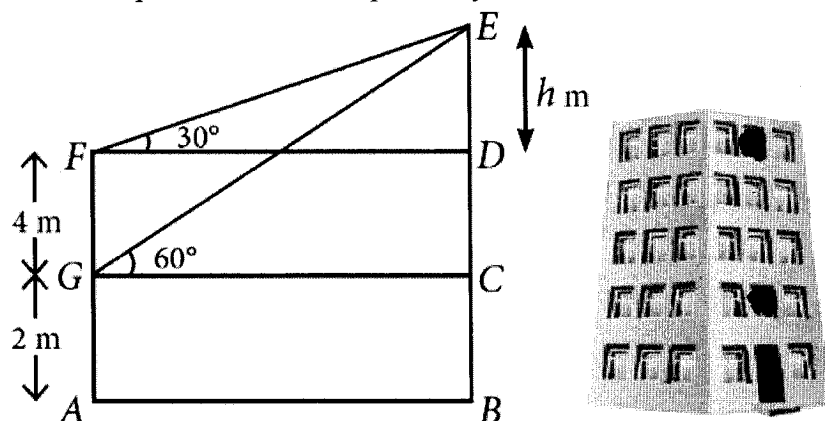
- 13 Ramesh's mother starts a new shoe shop. To display the shoes, she put 3 pairs of shoes in 1st row, 5 pairs in 2nd row, 7 pairs in 3rd row and so on.



Based on above information, answer the following questions.

- If she puts a total of 80 pairs of shoes, then find the number of rows required.
- What is the difference of pairs of shoes in 15th row and 10th row?

- 14 There are two windows in a house. First window is at the height of 2 m above the ground and other window is 4 m vertically above the lower window. Ankit and Radha are sitting inside the two windows at points G and F respectively.



At an instant, the angles of elevation of a balloon from these windows are observed to be 60° and 30° as shown below. Based on the above information, answer the following questions.

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