



MATHEMATICS

Class 10 - Mathematics

Time Allowed: 3 hours

Maximum Marks: 80

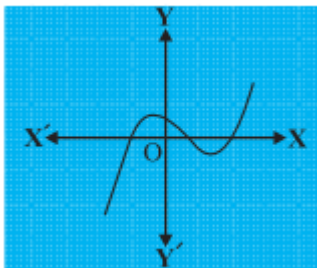
General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion-Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study-based questions carrying 4 marks each with sub-parts of the values of 1,1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

Section A

1. If the sum of LCM and HCF of two numbers is 1260 and their LCM is 900 more than their HCF, then the product of two numbers is [1]
 - a) 205400
 - b) 203400
 - c) 194400
 - d) 198400
2. Find the number of zeroes of $p(x)$ in the figure given below. [1]



a) 3

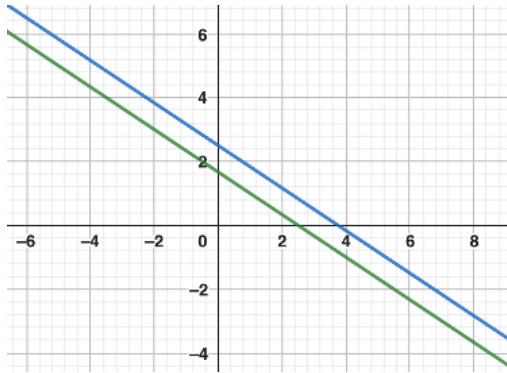
b) 0

c) 2

d) 1

3. The pair of equations $2x + 3y = 5$ and $4x + 6y = 15$ has

[1]



a) infinitely many solutions

b) exactly two solutions

c) no solution

d) a unique solution

4. $9x^2 - 6x - 4 = 0$ have

[1]

a) No Real roots

b) Real and Distinct roots

c) Real roots

d) Real and Equal roots

5. Which of the following statement is correct?

[1]

a. Sum of n terms of the list of numbers $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$ is $\frac{n(n+1)}{\sqrt{2}}$.

b. The common difference of the A.P. given by $a_n = 3n + 2$ is 3.

c. The sum of the A.P. $(-5), (-8), (-11), \dots, (-230)$ is -8930.

a) Only (a) and (b)

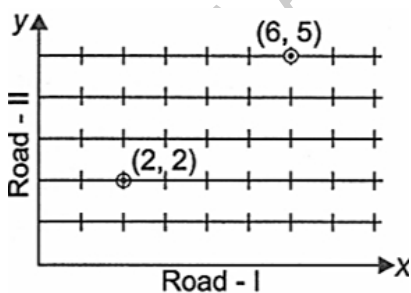
b) Only (b)

c) (a), (b) and (c)

d) Only (a)

6. A well-planned locality has two straight roads perpendicular to each other. There are 5 lanes parallel to Road - I. [1]

Each lane has 8 houses as seen in figure. Chaitanya lives in the 6th house of the 5th lane and Hamida lives in the 2nd house of the 2nd lane. What will be the shortest distance between their houses?



a) 12 units

b) 5 units

c) 6 units

d) 10 units

7. In what ratio, does x-axis divide the line segment joining the points $A(3, 6)$ and $B(-12, -3)$?

[1]

a) 2 : 1

b) 1 : 2

c) 4 : 1

d) 1 : 4

8. In the given figure if $PS \parallel QR$ and $PQ \parallel SR$ and $AT = AQ = 6$, $AS = 3$, $TS = 4$, then

[1]

What is the minimum distance each should walk so that each can cover the same distance in complete steps?

27. Find the zeroes of the polynomial $v^2 + 4\sqrt{3}v - 15$ by factorisation method and verify the relationship between the zeroes and coefficient of the polynomials. [3]
28. Jamila sold a table and a chair for Rs.1050, thereby making a profit of 10% on a table and 25% on the chair. If she had taken a profit of 25% on the table and 10% on the chair she would have got Rs.1065. Find the cost price of each. [3]

OR

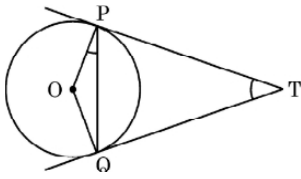
Solve the system of equations graphically:

$$3x - 4y = 7$$

$$5x + 2y = 3$$

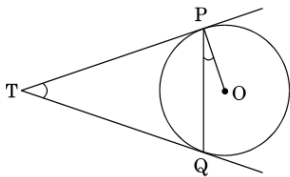
Shade the region between the lines and the y-axis

29. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$. [3]



OR

Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.



30. If $\cos \theta = \frac{7}{25}$, find the value of all T-ratios of θ . [3]
31. Find the median for the following data: [3]

Marks	30	35	40	45	25	70	20	60	90	15	80
Frequency	5	4	7	6	12	8	10	4	8	8	6

Section D

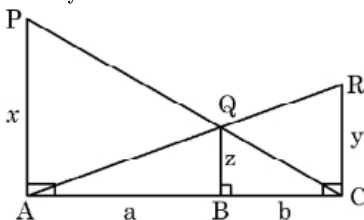
32. If (-5) is a root of the quadratic equation $2x^2 + px + 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, then find the values of p and k . [5]

OR

A rectangular field is 20 m long and 14 m wide. There is a path of equal width all around it, having an area of 111 sq m. Find the width of the path.

33. PA, QB and RC are each perpendicular to AC. If $AP = x$, $QB = z$, $RC = y$, $AB = a$ and $BC = b$, then prove that [5]

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$$



34. An iron pillar has some part in the form of a right circular cylinder and remaining in the form of a right circular cone. The radius of base of each of cone and cylinder is 8 cm. The cylindrical part is 240 cm high and the conical part is 36 cm high. Find the weight of the pillar, if one cubic cm of iron weighs 10 g. [5]

OR

A solid is in the shape of a right-circular cone surmounted on a hemisphere, the radius of each of them is being 3.5 cm and the total height of solid is 9.5 cm. Find the volume of the solid.

35. Find the mean and the median of the following data: [5]

Marks	Number of Students
0 - 10	3
10 - 20	5
20 - 30	16
30 - 40	12
40 - 50	13
50 - 60	20
60 - 70	6
70 - 80	5

Section E

36. Read the following text carefully and answer the questions that follow: [4]

Suman is celebrating his birthday. He invited his friends. He bought a packet of toffees/candies which contains 360 candies. He arranges the candies such that in the first row there are 3 candies, in second there are 5 candies, in third there are 7 candies and so on.

- Find the total number of rows of candies. (1)
- How many candies are placed in last row? (1)
- If Aditya decides to make 15 rows, then how many total candies will be placed by him with the same arrangement? (2)

OR

Find the number of candies in 12th row. (2)

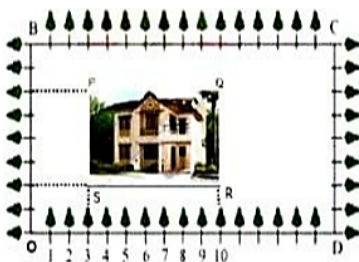
37. Read the following text carefully and answer the questions that follow: [4]

Using Cartesian Coordinates we mark a point on a graph by how far along and how far up it is.

The left-right (horizontal) direction is commonly called X-axis.

The up-down (vertical) direction is commonly called Y-axis.

In Green Park, New Delhi Suresh is having a rectangular plot ABCD as shown in the following figure. Sapling of Gulmohar is planted on the boundary at a distance of 1 m from each other. In the plot, Suresh builds his house in the rectangular area PQRS. In the remaining part of plot, Suresh wants to plant grass.



- Find the coordinates of the midpoints of the diagonal QS. (1)
- Find the length and breadth of rectangle PQRS? (1)

iii. Find Area of rectangle PQRS. (2)

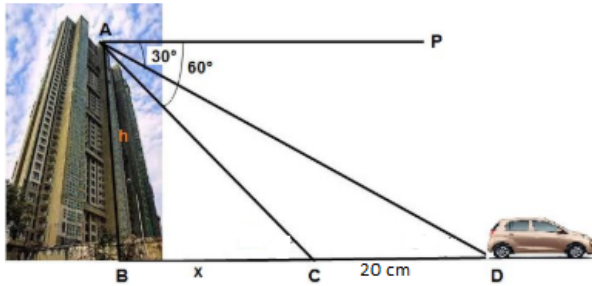
OR

Find the diagonal of rectangle. (2)

38. **Read the following text carefully and answer the questions that follow:**

[4]

Vijay lives in a flat in a multi-story building. Initially, his driving was rough so his father keeps eye on his driving. Once he drives from his house to Faridabad. His father was standing on the top of the building at point A as shown in the figure. At point C, the angle of depression of a car from the building was 60° . After accelerating 20 m from point C, Vijay stops at point D to buy ice cream and the angle of depression changed to 30° .



i. Find the value of x. (1)

ii. Find the height of the building AB. (1)

iii. Find the distance between top of the building and a car at position D? (2)

OR

Find the distance between top of the building and a car at position C? (2)