

UNIQUE STUDY POINT

AMITESH NAGAR, INDORE

CASE STUDY BASED QUESTIONS (2026-27)

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

Prepared by: SUMEET SAHU | Website : [Click Here](#) | WhatsApp Channel : [Click Here](#)

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Class : X

Subject : Mathematics

Questions : 187

Marks : 4 each

General Instructions :

- This question paper contains 187 case based questions divided into 13 sections.
- Each question carries 4 marks; internal choice (OR) is given in the last part of many questions.
- Read each case study carefully before answering the sub-parts.
- All questions are compulsory. Use of a calculator is not permitted.

SECTION - A : REAL NUMBERS

This section consists of 5 case based questions of 4 marks each.

1. Teaching Mathematics through activities is a powerful approach that enhances students' understanding and engagement. Keeping this in mind, Ms. Mukta planned a prime number game for class 5 students. She announces the number 2 in her class and asked the first student to multiply it by a prime number and then pass it to second student. Second student also multiplied it by a prime number and passed it to third student. In this way by multiplying to a prime number, the last student got 173250. [4]

Now, Mukta asked some questions as given below to the students:

- What is the least prime number used by students? (1)
- a. How many students are in the class? (2)

OR

- b. What is the highest prime number used by students? (2)
- Which prime number has been used maximum times? (1)

2. February 14 is celebrated as International Book Giving Day and many countries in the world celebrate this day. Some people in India also started celebrating this day and donated the following number of books of various subjects to a public library: [4]

History = 96, Science = 240, Mathematics = 336.

These books have to be arranged in minimum number of stacks such that each stack contains books of only one subject and the number of books on each stack is the same.

- How many books are arranged in each stack? (1)
- How many stacks are used to arrange all the Mathematics books? (1)
- Determine the total number of stacks that will be used for arranging all the books. (2)

OR

If the thickness of each book of History, Science and Mathematics is 1.8 cm, 2.2 cm and 2.5 cm respectively, then find the height of each stack of History, Science and Mathematics books. (2)

3. Khushi wants to organize her birthday party. Being health conscious, she decided to serve only fruits in her birthday party. She bought 36 apples and 60 bananas and decided to distribute fruits equally among all. [4]

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- How many guests Khushi can invite at the most? (1)
- How many apples and bananas will each guest get? (1)
- If Khushi decides to add 42 mangoes, how many guests Khushi can invite at the most? (2)

OR

If the cost of 1 dozen of bananas is ₹ 60, the cost of 1 apple is ₹ 15 and cost of 1 mango is ₹ 20, find the total amount spent on 60 bananas, 36 apples and 42 mangoes. (2)

4. Richa is an artificial jewellery seller. She buys them from a dealer at a price based on the presence or absence of stones as shown in the table below. [4]

Item	With stones	Without stones
Ring	110	70
Earring pair	170	90
Bangle pair	90	120

- For every ring with stones, two rings without stones are purchased by Richa's customers. Richa buys rings accordingly from the dealer for ₹ 10000. How many rings does she buy?
- In her next visit to the dealer, Richa finds that dealer has increased the price of rings with stones by ₹ 10. Richa still wants to spend ₹ 10000 on rings. What is the reduction in the number of rings she buys?
 - 10
 - 20
 - 40
 - 50
- The dealer increases the price of one type of earrings. Richa buys earrings (with stones and without stones) in the ratio of 5: 9 before the price hike. After the price hike, she buys earrings in the ratio of 8 : 13 with the same amount of money. Does she buy more earrings with stones than earrings without stones after the price hike? Give reasons.
- Richa purchases 37 pairs of bangles with stones and 33 pairs of bangles without stones. She divides them into two sets. Set 1 contains 40 pairs of bangles, and set 2 contains 30 pairs of bangles. What is the difference between the number of bangle pairs with stones in set 1 and the number of bangle pairs without stones in set 2?
 - 4
 - 7
 - 10
 - 30

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- v. Despite the price hike by the dealer, Richa increases the number of jewellery with stones she purchases for her customers. What could be the reason for her decision?

5. A seminar is being conducted by an Educational Organisation, where the participants will be educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively. [4]



- What is the maximum number of participants that can be accommodated in each room if there are multiple rooms, and in each room, the same number of participants are to be seated, and all of them are in the same subject? (1)
- What is the minimum number of rooms required during the event? (1)
- Show that the product of two numbers 60 and 84 is equal to the product of their HCF and LCM. (2)

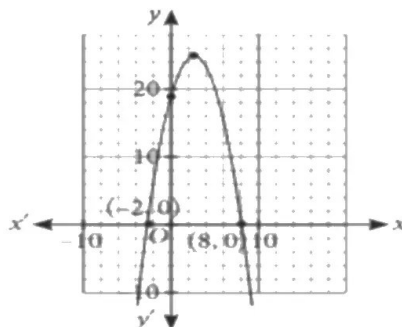
OR

What is the LCM of two numbers if their product is 1080 and their HCF is 30? (2)

SECTION - B : POLYNOMIALS

This section consists of 9 case based questions of 4 marks each.

6. Rachna and her husband Amit who is an architect by profession, visited France. They went to see Mont Blanc Tunnel which is a highway tunnel between France and Italy, under the Mont Blanc Mountain in the Alps, and has a parabolic cross-section. The mathematical representation of the tunnel is shown in the graph. [4]



- What will be the expression of the polynomial given in diagram? (1)
- What is the value of the polynomial, represented by the graph, when $x = 4$? (1)
- If the tunnel is represented by $-x^2 + 3x - 2$. Then what is its zeroes? (2)

OR

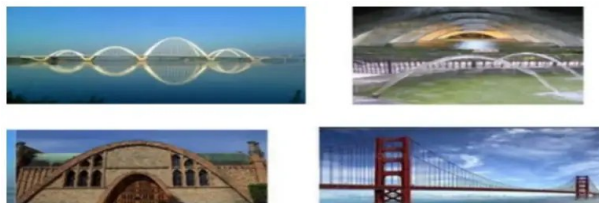
What is sum of zeros and product of zeros for $-x^2 + 3x - 2$? (2)

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7. The below picture are few natural examples of parabolic shape which is represented by a quadratic polynomial. A parabolic arch is an arch in the shape of a parabola. In structures, their curve represents an efficient method of load, and so can be found in bridges and in architecture in a variety of forms. [4]



- In the standard form of quadratic polynomial, $ax^2 + bx + c$, what are a , b and c ? (1)
- If the roots of the quadratic polynomial are equal, what is the discriminant D ? (1)
- If α and $\frac{1}{\alpha}$ are the zeroes of the quadratic polynomial $2x^2 - x + 8k$, then find the value of k ? (2)

OR

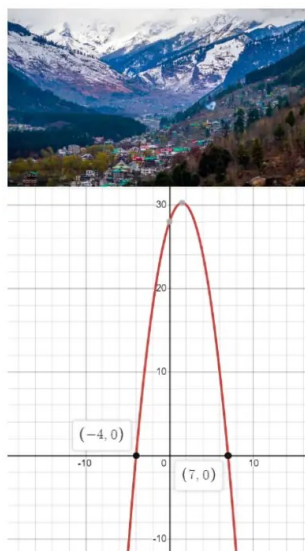
What is the relation between zeros and coefficient for a quadratic polynomial? (2)

8. An object which is thrown or projected into the air, subject to only the acceleration of gravity is called a projectile, and its path is called its trajectory. This curved path was shown by Galileo to be a parabola. Parabola is represented by a polynomial. If the polynomial to represent the distance covered is, $p(t) = -5t^2 + 40t + 1.2$ [4]
- What is the degree of the polynomial $p(t) = -5t^2 + 40t + 1.2$? (1)
 - What is the height of the projectile at the time of 4 seconds after it is launched? (1)
 - What is the name of the polynomial $p(t) = -5t^2 + 40t + 1.2$ that is classified based on its degree? (2)

OR

What are the factors of the given quadratic equation $p(x) = x^2 - 5x + 6$? (2)

9. Two friends Govind and Pawan decided to go for a trekking. During summer vacation, they went to Panchmarhi. While trekking they observed that the trekking path is in the shape of a parabola. The mathematical representation of the track is shown in the graph. [4]



- What are the zeroes of the polynomial whose graph is given? (1)
- What will be the expression of the given polynomial $p(x)$? (1)
- What is the product of the zeroes of the polynomial which represents the parabola? (2)

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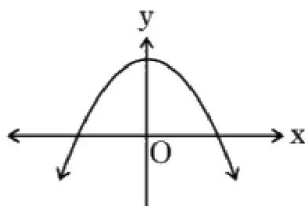
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OR

In the standard form of quadratic polynomial, $ax^2 + bx + c$, what are a , b , and c ? (2)

- 10.** Rainbow is an arch of colours that is visible in the sky after rain or when water droplets are present in the atmosphere. The colours of the rainbow are generally, red, orange, yellow, green, blue, indigo and violet. Each colour of the rainbow makes a parabola. We know that any quadratic polynomial $p(x) = ax^2 + bx + c$ ($a \neq 0$) represents a parabola on the graph paper. **[4]**

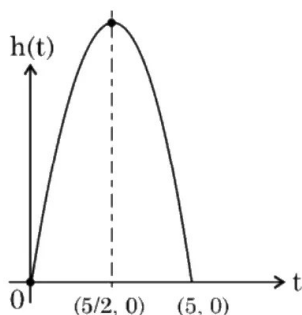


- The graph of a rainbow $y = f(x)$ is shown in the figure. Write the number of zeroes of the curve. (1)
- If the graph of a rainbow does not intersect the x -axis but intersects y -axis at one point, then how many zeroes will it have? (1)
- If a rainbow is represented by the quadratic polynomial $p(x) = x^2 + (a + 1)x + b$, whose zeroes are 2 and -3, find the value of a and b . (2)

OR

The polynomial $x^2 - 2x - (7p + 3)$ represents a rainbow. If -4 is a zero of it, find the value of p . (2)

- 11.** A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial $h = 25t - 5t^2$. **[4]**



Observe the graph of the polynomial and answer the following questions:

- Write zeroes of the given polynomial. **(1)**
- Find the maximum height achieved by ball. **(1)**

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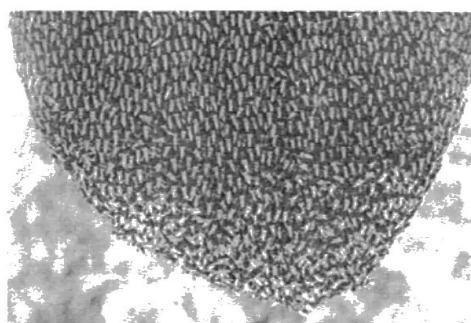
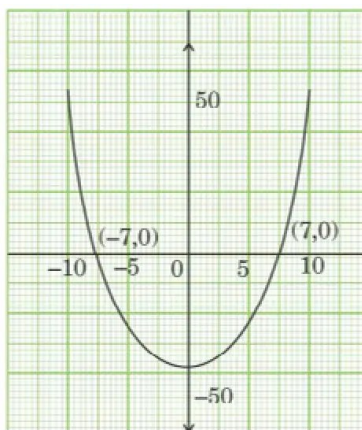
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- iii. a. After throwing upward, how much time did the ball take to reach to the height of 30 m? (2)

OR

- b. Find the two different values of t when the height of the ball was 20 m. (2)

12. While playing in a garden, Samaira saw a honeycomb and asked her mother what is that. Her mother replied that it's a honeycomb made by honey bees to store honey. Also, she told her that the shape of the honeycomb formed is a mathematical structure. The mathematical representation of the honeycomb is shown in the graph. [4]



- How many zeroes are there for the polynomial represented by the graph given? (1)
- Write the zeroes of the polynomial. (1)
- If the zeroes of a polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then determine the values of a and b . (2)

OR

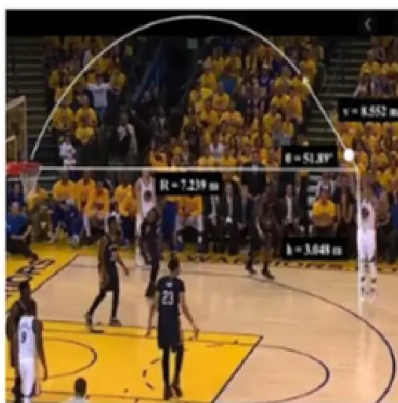
If the square of difference of the zeroes of the polynomial $x^2 + px + 45$ is 144, then find the value of p . (2)

13. Basketball and soccer are played with a spherical ball. Even though an athlete dribbles the ball in both sports, a basketball player uses his hands and a soccer player uses his feet. Usually, soccer is played outdoors on a large field and basketball is played indoor on a court made out of wood. The projectile (path traced) of soccer ball and basketball are in the form of parabola representing quadratic polynomial. [4]

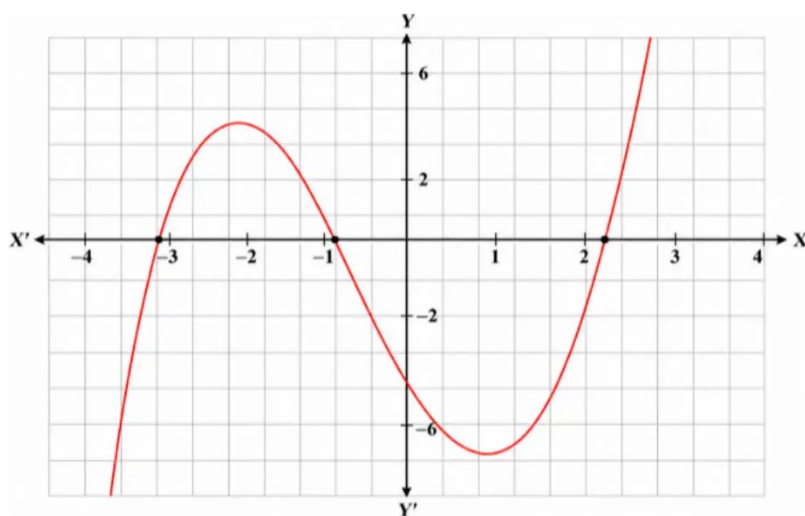
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- Which type the shape of the path traced shown in given figure? (1)
- Why the graph of parabola opens upwards? (1)
- In the below graph, how many zeroes are there? (2)



OR

What is the condition for the graph of parabola to open downwards? (2)

- 14.** An asana is a body posture, originally and still a general term for a sitting meditation pose, and later extended in hatha yoga and modern yoga as exercise, to any type of pose or position, adding reclining, standing, inverted, twisting, and balancing poses. In the figure, one can observe that poses can be related to representation of quadratic polynomial. **[4]**



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- Which type the shape of the poses shown in figure? (1)
- In the graph, how many zeroes are there for the polynomial? (1)



- Write two zeroes in the shown given graph? (2)



OR

How many zeroes are possible for a quadratic polynomial? (2)

SECTION - C : PAIR OF LINEAR EQUATIONS

This section consists of 8 case based questions of 4 marks each.

- 15. TOWER OF PISA :** To prove that objects of different weights fall at the same rate, Galileo dropped two objects with different weights from the Leaning Tower of Pisa in Italy. The objects hit the ground at the same time. An object dropped off the top of Leaning Tower of Pisa falls vertically with constant acceleration. If s is the distance of the object above the ground (in feet) t seconds after its release, then s and t are related by an equation of the form $s = a + bt^2$ where a and b are constants. Suppose the object is 180 feet above the ground 1 second after its release and 132 feet above the ground 2 seconds after its release.

[4]



- Find the constants a and b . (1)
- How high is the Leaning Tower of Pisa? (1)
- How long does the object fall? (2)

OR

At $t = 2$ sec, the object is at what height? (2)

- 16. Large cargo ships ferry cargo between ports.** They take months to ferry them from one port to another. The distance in the sea is calculated in nautical miles (nm). The map shows the eastbound (grey) and westbound (black) cargo lines of a shipment company.

[4]

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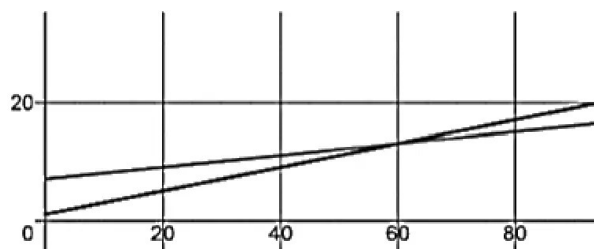
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The distance between port 6 and port 7 is approximately 20000 nm and a ship takes 95 days to travel between the ports in either direction.

The distance-time graph drawn by Pooja shows the journey of eastbound and westbound ships.



- What do the two axes in the graph show?
- According to Pooja's graph, what is the approximate distance travelled by the eastbound ship during these 95 days?
- Anish looks at the graph and claims that an eastbound ship route meets the westbound route at 13000 nm. Is he correct? Give reasons.
- The eastbound and westbound journeys are of different length in 95 days. What can be the possible reason for it?

- 17.** Lokesh, a production manager in Mumbai, hires a taxi everyday to go to his office. The taxi charges in Mumbai consists of a fixed charges together with the charges for the distance covered. His office is at a distance of 10 km from his home. For a distance of 10 km to his office, Lokesh paid ₹ 105. While coming back home, he took another route. He covered a distance of 15 km and the charges paid by him were ₹ 155. **[4]**

- What are the fixed charges? (1)
- What are the charges per km? (1)
- If fixed charges are ₹ 20 and charges per km are ₹ 10, then how much Lokesh have to pay for travelling a distance of 10 km? (2)

OR

Find the total amount paid by Lokesh for travelling 10 km from home to office and 25 km from office to home. [Fixed charges and charges per km are as in (i) & (ii). (2)]

- 18.** Tickets for a play can be booked online as well as purchased from the theatre. A 10% discount is available on online ticket purchase. Simran likes to watch plays. She purchased the ticket online for a play. The ticket and food cost her ₹ 600. The cost of food was one-third the cost of the ticket. **[4]**

- Represent the relation between the cost of the ticket and the cost of food for Simran algebraically. Also represent the relation between the cost of the ticket and the cost of food for Simran and money spent algebraically.

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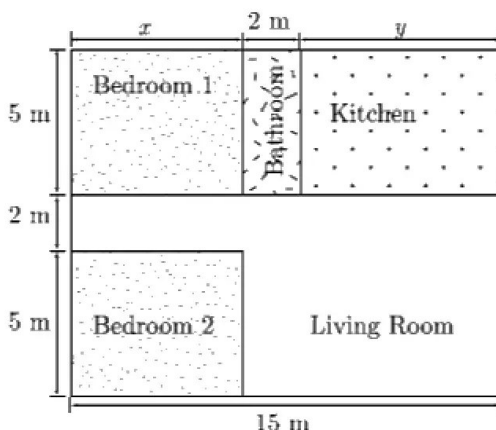
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- ii. Simran purchased the ticket for a musical play from the theatre. How much can she spend on food in ₹ 600?
- iii. A group of friends went to watch a play. Some of them purchased tickets online and some bought them at the theatre. If two more had purchased online tickets the total ticket price would be ₹ 100 less. Is this true for any group greater than 2? Why?
- iv. In the theatre canteen, two packets of popcorn and a mango drink cost ₹ 330. One packet of popcorn and two mango drinks cost ₹ 300. What is the cost of the packet of popcorn?
 - a. 100
 - b. 120
 - c. 150
 - d. 200

- 19. Architect :** An architect is a skilled professional who plans and designs buildings and generally plays a key role in their construction. Architects are highly trained in the art and science of building design. Since they bear responsibility for the safety of their buildings' occupants, architects must be professionally licensed. **[4]**

Vishu is a licensed architect and design very innovative house. She has made a house layout for her client which is given below. In the layout, the design and measurements has been made such that area of two bedrooms and kitchen together is 95 sq. m.



- i. Which pair of linear equations does describe this situation? (1)
- ii. What is the length of the outer boundary of the layout? (1)
- iii. What is the area of the bedroom 1? (2)

OR

What is the area of living room in the layout? (2)

- 20.** A telecommunication company came up with two plans- plan A and plan B for its customers. The plans are represented by linear equations where ' t ' represents the time **[4]**

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(in minutes) bought and 'C' represents the cost. The equations are:

Plan A: $3C = 20t$ Plan B: $3C = 10t + 300$ Based on above information, answer the following questions:

- If you purchase plan B, how much initial amount you have to pay? **(1)**
- Charu purchased plan A. How many minutes she bought for ₹ 250? **(1)**
- a. At how many minutes, do both the plans charge the same amount? What is that amount?

(2)

OR

- Which plan is better if you want to buy 60 minutes? Give reason for your answer.
- (2)**

- 21.** A school is organizing a grand cultural event to show the talent of its students. To accommodate the guests, the school plans to rent chairs and tables from a local supplier. It finds that rent for each chair is ₹ 50 and for each table is ₹ 200. The school spends ₹ 30,000 for renting the chairs and tables. Also, the total number of items (chairs and tables) rented are 300. **[4]**

If the school rents 'x' chairs and 'y' tables, answer the following questions:

- Write down the pair of linear equations representing the given information. **(1)**
- a. Find the number of chairs and number of tables rented by the school. **(2)**

OR

- b. If the school wants to spend a maximum of ₹ 27,000 on 300 items (tables and chairs), then find the number of chairs and tables it can rent. **(2)**
- iii. What is maximum number of tables that can be rented in ₹ 30,000 if no chairs are rented? **(1)**

- 22.** Essel World is one of India's largest amusement parks that offers a diverse range of thrilling rides, water attractions and entertainment options for visitors of all ages. The park is known for its iconic "Water Kingdom" section, making it a popular destination for family outings and fun-filled adventure. The ticket charges for the park are ₹ 150 per child and ₹ 250 per adult. **[4]**

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On a day, the cashier of the park found that 300 tickets were sold and an amount of ₹ 55,000 was collected.

Based on the above, answer the following questions:

- If the number of children visited be x and the number of adults visited be y , then write the given situation algebraically. **(1)**
- a. How many children visited the amusement park that day? **(2)**

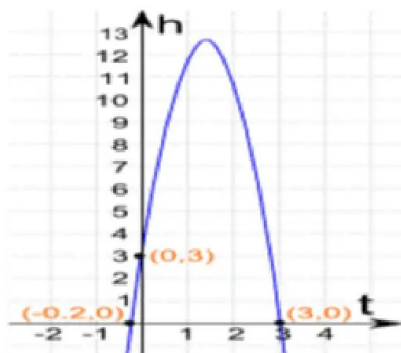
OR

- How many adults visited the amusement park that day? **(2)**
- How much amount will be collected if 250 children and 100 adults visit the amusement park? **(1)**

SECTION - D : QUADRATIC EQUATIONS

This section consists of 7 case based questions of 4 marks each.

23. Michael throws a ball with a speed of 14 m/s which follows the curve $= -5t^2 + 14t + 3$ **[4]**
where h represents height in meters and time t in seconds.



- Find the possible values of t when the ball touches the ground. **(1)**
- Find the maximum height attained by the ball. **(1)**
- What is the vertical component of velocity at $h_{\max}$? **(2)**

OR

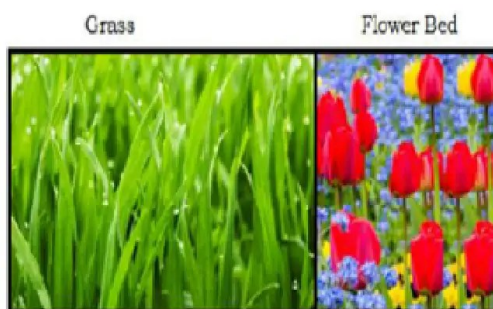
Find the position of ball at $t = 18$. **(2)**

24. Shreya has a field with a flowerbed and grassland. The grassland is in the shape of rectangle while flowerbed is in the shape of square. The length of the grassland is found to be 3 m more than twice the length of the flowerbed. Total area of the whole land is 1260 m^2 . **[4]**

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- If the length of the square is x m then find the total length of the field. (1)
- What will be the perimeter of the whole figure in terms of x ? (1)
- Find the value of x if the area of total field is 1260 m^2 . (2)

OR

Find area of grassland and the flowerbed separately. (2)

- 25.** A garden designer is planning a rectangular lawn that is to be surrounded by a uniform walkway. The total area of the lawn and the walkway is 360 square metres. The width of the walkway is same on all sides. The dimensions of the lawn itself are 12 metres by 10 metres. **[4]**

Based on the information given above, answer the following questions:

- Formulate the quadratic equation representing the total area of the lawn and the walkway, taking width of walkway = x m. (1)
- a. Solve the quadratic equation to find the width of the walkway ' x '. (2)

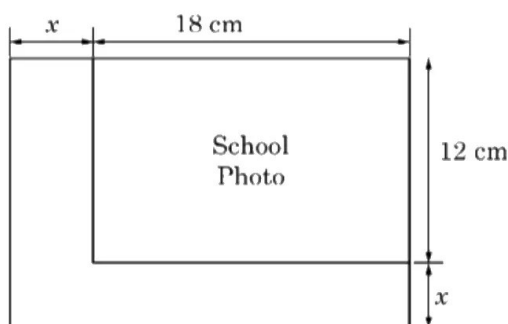
OR

- b. If the cost of paving the walkway at the rate of ₹ 50 per square metre is ₹ 12,000, calculate the area of the walkway. (2)

- iii. Find the perimeter of the lawn. (1)

- 26.** While designing the school year book, a teacher asked the student that the length and width of a particular photo is increased by x units each to double the area of the photo. The original photo is 18 cm long and 12 cm wide. **[4]**

- Write an algebraic equation depicting the above information. (1)
- Write the corresponding quadratic equation in standard form. (1)
- What should be the new dimensions of the enlarged photo? (2)



OR

Can any rational value of x make the new area equal to 220 cm^2 ? (2)

- 27.** The tradition of pottery making in India is very old. In fact, it is older than Indus Valley Civilization. The shaping and baking of clay articles has continued through the ages. The picture of a potter is shown below: **[4]**

A potter makes a certain number of pottery articles in a day. It was observed on a particular day the cost of production of each article (in ₹) was one more than twice the

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number of articles produced on that day. The total cost of production on that day was ₹ 210.

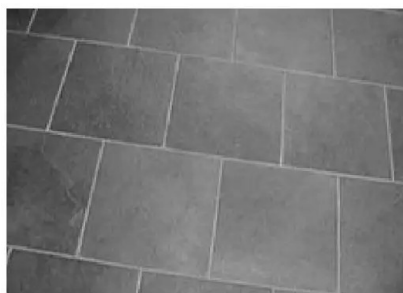


- Taking number of articles produced on that day as x , form a quadratic equation in x . (1)
- Find the number of articles produced and the cost of each article. (1)
- Find the cost of production of 15 articles. (2)

OR

Find the number of articles made by Potter in a day if the total cost of production is ₹ 1575. (2)

- 28.** A rectangular floor area can be completely tiled with 200 square tiles. If the side length of each tile is increased by 1 unit, it would take only 128 tiles to cover the floor. **[4]**



- Assuming the original length of each side of a tile be x units, make a quadratic equation from the above information. (1)
- Write the corresponding quadratic equation in standard form. (1)
- a. Find the value of x , the length of side of a tile by factorisation. (2)

OR

- b. Solve the quadratic equation for x , using quadratic formula. (2)

- 29.** The angry Arjun carried some arrows for fighting with Bheeshm. With the half of the arrows, he cut down the arrows thrown by Bheeshm on him and with six other arrows, he killed the charioteer of Bheeshm. With one arrow each, he knocked down respectively the chariot, flag and the bow of Bheeshma. Finally, with one more than four times the square root of arrows, he laid Bheeshm unconscious on an arrow bed. **[4]**



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- If Arjun had x arrows then by how many arrows he cut down arrows thrown by Bheeshm? (1)
- If Arjun had x arrows then by how many arrows he laid Bheeshm unconscious on arrow bed? (1)
- Find the total number of arrows Arjun had. (2)

OR

From a quadratic equation by the no of arrows used by Arjuna? (2)

SECTION - E : ARITHMETIC PROGRESSIONS

This section consists of 33 case based questions of 4 marks each.

- 30.** The marathon is a long-distance foot race with a distance of 42.195 km, usually run as a road race, but the distance can be covered on trail routes. The marathon can be completed by running or with a run/walk strategy. The marathon was one of the original modern Olympic events in 1896. **[4]**



Neha, a student of class X, wishes to participate in a marathon. She decided to begin her practice by gradually increasing her running distance. In the first week, she decided to run 3 km each day and increase the distance by 2 km each week, i.e., in the second week she would run 5 km each day, in the third week she would run 7 km each day and so on.

Based on the above information, answer the following questions:

- What distance will Neha cover each day of the 8th week of her practice? **(1)**
- In which week would she be able to run for 45 km each day? **(1)**
- a. What is the total distance covered by Neha after 11 weeks, if she practised for 5 days in each week? **(2)**

OR

- Had she increased the distance by 3 km each week instead of 2 km each week, in how many weeks would she have trained herself to run for 42 km per day? **(2)**

- 31.** In order to organise, Annual Sports Day, a school prepared an eight lane running track with an integrated football field inside the track area as shown below: **[4]**

The length of innermost lane of the track is 400 m and each subsequent lane is 7.6 m longer than the preceding lane.

Based on given information, answer the following questions, using concept of Arithmetic Progression.

- What is the length of the 6th lane? **(1)**
- How long is the 8th lane than that of 4th lane? **(1)**
- a. While practicing for a race, a student took one round each in first six lanes. Find the total distance covered by the student. **(2)**

OR

- a. A student took one round each in lane 4 to lane 8. Find the total distance covered by the student. **(2)**

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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- 32.** Treasure Hunt is an exciting and adventurous game where participants follow a series of clues/numbers/maps to discover hidden treasures. Players engage in a thrilling quest, solving puzzles and riddles to unveil the location of the coveted prize. **[4]**

While playing a treasure hunt game, some clues (numbers) are hidden in various spots collectively forming an A.P. If the number on the n^{th} spot is $20 + 4n$, then answer the following questions to help the players in spotting the clues:



- i. Which number is on first spot? **(1)**
- ii. a. Which spot is numbered as 112? **(2)**
OR
b. What is the sum of all the numbers on the first 10 spots? **(2)**
- iii. Which number is on the $(n - 2)^{\text{th}}$ spot? **(1)**

- 33.** Saving money is a good habit and it should be inculcated in children right from the beginning. Rehan's mother brought a piggy bank for Rehan and puts one ₹ 5 coin of her savings in the piggy bank on the first day. She increases his savings by one ₹ 5 coin daily. **[4]**



Based on the above information, answer the following questions:

- i. How many coins were added to the piggy bank on 8th day?
- ii. How much money will be there in the piggy bank after 8 days?
- iii. a. If the piggy bank can hold one hundred twenty ₹ 5 coins in all find the number of days she can contribute to put ₹ 5 coins into it.

OR

- b. Find the total money saved, when the piggy bank is full.

- 34.** While preparing for a competitive examination, Akbar came across a match-stick pattern based question. The pattern is given below: **[4]**

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CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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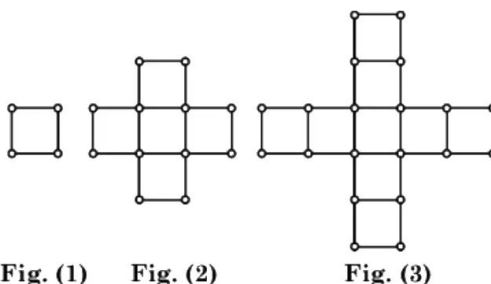


Fig. (1) Fig. (2) Fig. (3)

Based on the above information, answer the following questions:

- Write first term and common difference of the A.P. formed by number of squares in each figure.
- Write first term and common difference of the A.P. formed by number of sticks used in each figure.
- a. How many squares are there in Fig. (10)? Also, write the number of sticks used in Fig. (10).

OR

- If 88 sticks are used to make m th figure (Fig. (m)), find the value of m . How many squares are formed in this figure?

- 35.** Akshat's father is planning some construction work in his terrace area. He ordered 360 bricks and instructed the supplier to keep the bricks in such a way that the bottom row has 30 bricks and next is one less than that and so on. **[4]**

The supplier stacked these 360 bricks in the following manner, 30 bricks in the bottom row, 29 bricks in the next row, 28 bricks in the row next to it, and so on.

- In how many rows, 360 bricks are placed?
- How many bricks are there in the top row?

- 36.** A school is organizing a charity run to raise funds for a local hospital. The run is planned as a series of rounds around a track, with each round being 300 metres. To make the event more challenging and engaging, the organizers decide to increase the distance of each subsequent round by 50 metres. For example, the second round will be 350 metres, the third round will be 400 metres and so on. The total number of rounds planned is 10. **[4]**



Based on the information given above, answer the following questions:

- Write the fourth, fifth and sixth term of the Arithmetic Progression so formed. **(1)**
- Determine the distance of the 8th round. **(1)**
- a. Find the total distance run after completing all 10 rounds. **(2)**

OR

- If a runner completes only the first 6 rounds, what is the total distance run by the runner? **(2)**

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37. Jaspal Singh is an auto driver. His autorickshaw was too old and he had to spend a lot of money on repair and maintenance every now and then. One day he got to know about the EV scheme of the Government of India where he can not only get a good exchange bonus but also avail heavy discounts on the purchase of an electric vehicle. So, he took a loan of ₹ 1,18,000 from a reputed bank and purchased a new autorickshaw. [4]



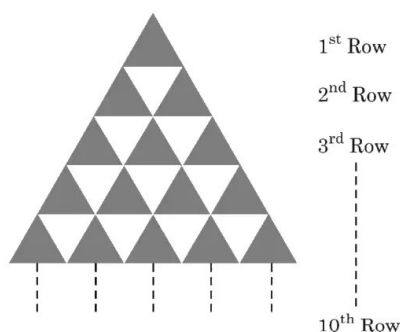
Jaspal Singh repays his total loan of ₹ 118000 by paying every month starting with the first instalment of ₹ 1000.

- If he increases the instalment by ₹ 100 every month, then what amount will be paid by him in the 30th instalment? (1)
- If he increases the instalment by ₹ 100 every month, then what amount of loan does he still have to pay after 30th instalment? (1)
- If he increases the instalment by ₹ 100 every month, then what amount will be paid by him in the 100th instalment? (2)

OR

If he increases the instalment by ₹ 200 every month, then what amount would he pay in 40th instalment? (2)

38. In an equilateral triangle of side 10 cm, equilateral triangles of side 1 cm are formed as shown in the figure below, such that there is one triangle in the first row, three triangles in the second row, five triangles in the third row and so on. [4]



Based on given information, answer the following questions using Arithmetic Progression.

- How many triangles will be there in bottom most row? (1)
- How many triangles will be there in fourth row from the bottom? (1)
- a. Find the total number of triangles of side 1 cm each till 8th row. (2)

OR

- b. How many more number of triangles are there from 5th row to 10th row than in first 4 rows? Show working. (2)

39. Saving money is a good habit and it should be inculcated in children from the beginning. Mrs. Pushpa brought a piggy bank for her child Akshar. He puts one five-rupee coin of his savings in the piggy bank on the first day. He increases his savings by one five-rupee coin daily. [4]

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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- If the piggy bank can hold 190 coins of five rupees in all, find the number of days he can contribute to put the five-rupee coins into it
- Find the total money he saved.

- 40.** In a society, a yoga instructor was hired to train the people of the society to live a healthy lifestyle. Yoga sessions were held daily from 5 p.m. to 7 p.m. in the society park. On day one, 5 people joined the yoga session, on day two, 3 more people joined, on day three, another 3 people joined and in this manner every next day, 3 more people kept on joining. **[4]**



Based on the given information, answer the following questions :

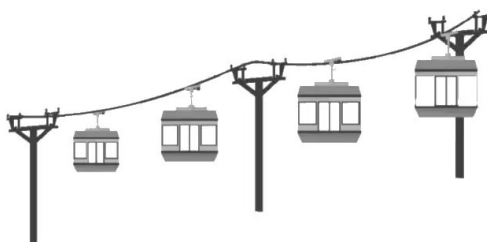
- On which day did 59 people join the yoga session? **(1)**
- How many people joined the yoga session on the 31st day? **(1)**
- a. The yoga instructor was paid ₹ 100 for each person attending the yoga session. On which day would he earn ₹5,000? **(2)**

OR

- What was the total amount earned by the yoga instructor in 16 days? **(2)**

- 41.** Cable cars at hill stations are one of the major tourist attractions. On a hill station, the length of cable car ride from base point to top most point on the hill is 5000 m. Poles are installed at equal intervals on the way to provide support to the cables on which car moves. **[4]**

The distance of first pole from base point is 200 m and subsequent poles are installed at equal interval of 150 m. Further, the distance of last pole from the top is 300 m.



Based on above information, answer the following questions using Arithmetic Progression:

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

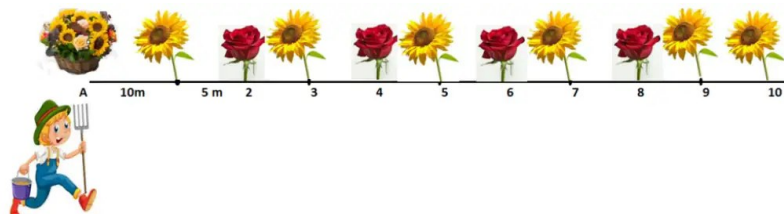
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- i. Find the distance of 10th pole from the base. **(1)**
- ii. Find the distance between 15th pole and 25th pole. **(1)**
- iii. a. Find the time taken by cable car to reach 15th pole from the top if it is moving at the speed of 5 m/sec and coming from top. **(2)**

OR

- b. Find the total number of poles installed along the entire journey. **(2)**

- 42.** In a school garden, Dinesh was given two types of plants viz. sunflower and rose flower as shown in the following figure. **[4]**



The distance between two plants is to be 5m, a basket filled with plants is kept at point A which is 10 m from the first plant. Dinesh has to take one plant from the basket and then he will have to plant it in a row as shown in the figure and then he has to return to the basket to collect another plant. He continues in the same way until all the flower plants in the basket. Dinesh has to plant ten numbers of flower plants.

Now answer the following questions:

- i. Find the distance covered by Dinesh to plant the first 5 plants and return to basket. **(2)**
- ii. Find the distance covered by Dinesh to plant all 10 plants and return to basket. **(1)**
- iii. If the speed of Dinesh is 10 m/min and he takes 15 minutes to plant a flower plant then find the total time taken by Dinesh to plant 10 plants. **(1)**

- 43.** 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. **[4]**

- i. Find the total number of rows of candies. (1)
- ii. How many candies are placed in last row? (1)
- iii. 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)

- 44.** Kamla and her husband were working in a factory in Seelampur, New Delhi. During the pandemic, they were asked to leave the job. As they have very limited resources to survive in a metro city, they decided to go back to their hometown in Himachal Pradesh. After a few months of struggle, they thought to grow roses in their fields and sell them to local vendors as roses have been always in demand. Their business started growing up and they hired many workers to manage their garden and do packaging of the flowers. **[4]**



UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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In their garden bed, there are 23 rose plants in the first row, 21 are in the 2nd, 19 in 3rd row and so on. There are 5 plants in the last row.

- How many rows are there of rose plants? (1)
- Also, find the total number of rose plants in the garden. (1)
- How many plants are there in 6th row. (2)

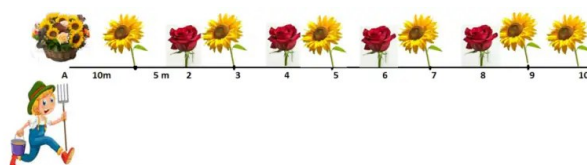
OR

If total number of plants are 80 in the garden, then find number of rows? (2)

- 45.** The students of a school decided to beautify the school on an 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 metre. The flags are stored at the position of the middlemost 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. **[4]**

- How much distance did she cover in completing this job and returning to collect her books?
- What is the maximum distance she travelled carrying a flag?

- 46.** In a school garden, Dinesh was given two types of plants viz. sunflower and rose flower as shown in the following figure. **[4]**



The distance between two plants is to be 5m, a basket filled with plants is kept at point A which is 10 m from the first plant. Dinesh has to take one plant from the basket and then he will have to plant it in a row as shown in the figure and then he has to return to the basket to collect another plant. He continues in the same way until all the flower plants in the basket. Dinesh has to plant ten numbers of flower plants.

- Write the above information in the progression and find first term and common difference. (1)
- Find the distance covered by Dinesh to plant the first 5 plants and return to basket. (1)
- Find the distance covered by Dinesh to plant all 10 plants and return to basket. (2)

OR

If the speed of Dinesh is 10 m/min and he takes 15 minutes to plant a flower plant then find the total time taken by Dinesh to plant 10 plants. (2)

- 47.** Deepa has to buy a scooty. She can buy scooty either making cashdown payment of ₹ 25,000 or by making 15 monthly instalments as below. **[4]**

Ist month - ₹ 3425, IInd month - ₹ 3225, Illrd month - ₹ 3025, IVth month - ₹ 2825 and so on



- Find the amount of 6th instalment. (1)
- Total amount paid in 15 instalments. (1)
- Deepa paid 10th and 11th instalment together find the amount paid that month. (2)

UNIQUE STUDY POINT

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OR

If Deepa pays ₹2625 then find the number of instalment. (2)

48. Sehaj Batra gets pocket money from his father every day. Out of pocket money, he saves money for poor people in his locality. On 1st day he saves ₹ 27.5 On each succeeding day he increases his saving by ₹ 2.5. [4]

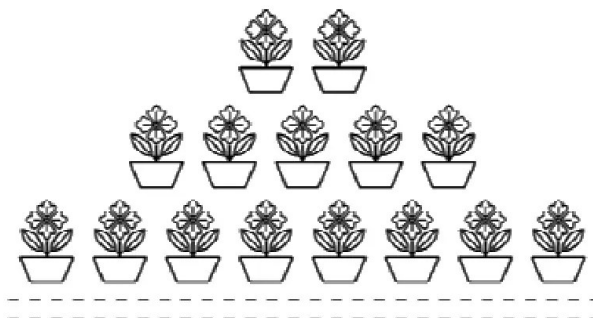


- Find the amount saved by Sehaj on 10th day. (1)
- Find the amount saved by Sehaj on 25th day. (1)
- Find the total amount saved by Sehaj in 30 days. (2)

OR

Find in how many days Sehaj saves ₹ 1400. (2)

49. Aahana being a plant lover decides to convert her balcony into beautiful garden full of plants. She bought few plants with pots for her balcony. She placed the pots in such a way that number of pots in the first row is 2, second row is 5, third row is 8 and so on. [4]



- Find the number of pots placed in the 10th row. (1)
- Find the difference in the number of pots placed in 5th row and 2nd row. (1)
- If Aahana wants to place 100 pots in total, then find the total number of rows formed in the arrangement. (2)

OR

If Aahana has sufficient space for 12 rows, then how many total number of pots are placed by her with the same arrangement? (2)

50. Elpis Technology is a TV manufacturer company. It produces smart TV sets not only for the Indian market but also exports them to many foreign countries. Their TV sets have been in demand every time but due to the Covid-19 pandemic, they are not getting sufficient spare parts, especially chips to accelerate the production. They have to work in a limited capacity due to the lack of raw materials. [4]



UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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- They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find an increase in the production of TV every year. (1)
- They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find in which year production of TV is 1000. (1)
- They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find the production in the 10th year. (2)

OR

They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find the total production in first 7 years. (2)

- 51.** In a potato race, a bucket is placed at the starting point, which is 5 m from the first potato, and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line. A competitor starts from the bucket, picks up the nearest potato, runs back with it, drops it in the bucket, runs back to pick up the next potato, runs to the bucket to drop it in, and she continues in the same way until all the potatoes are in the bucket. What is the total distance the competitor has to run? **[4]**



- Find the terms of AP formed in above situation. (1)
- What is the total distance the competitor has to run? (1)
- Find distance cover after 4 potato drop in the bucket? (2)

OR

Find the distance covered by competitor in order to put 5th potato in the bucket. (2)

- 52.** Your elder brother wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of ₹ 1,18,000 by paying every month starting with the first instalment of ₹ 1000. If he increases the instalment by ₹ 100 every month, answer the following: **[4]**



- Find the amount paid by him in 30th installment. (1)
- Find the amount paid by him in 30 installments. (1)
- If total installments are 40 then amount paid in the last installment? (2)

OR

Find the 10th installment, if the 1st installment is of ₹ 2000. (2)

- 53.** A tent house owner provides furniture on rent. He stacks chairs in his shop to save space. In the diagram, the height of seat of chair from ground is represented by $h_1, h_2, h_3, \dots$. The height of first seat is 44 cm from ground level and gap between every two seats is 10 cm. **[4]**
- Write the values of h_1, h_2, h_3, h_4 and h_5 in this order only. **(1)**
 - Show that the above values form an A.P. Write its first term and common difference. **(1)**

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- iii. a. If chairs can be stacked up to the maximum height of 160 cm, then find the maximum number of chairs in a stack. (2)

OR

- b. Is it possible to stack 15 chairs if maximum height of the stack can not be more than 180 cm? Justify your answer. (2)

54. Sumant's mother started a new shoe shop. To display the shoes, she put 3 pairs of shoes in the 1st row, 5 pairs in the 2nd row, 7 pairs in the 3rd row and so on. [4]



Based on the above information, answer the following questions:

- i. How many pairs of shoes are displayed in the 6th row? (1)
ii. What is the difference of pairs of shoes in the 1st row and the 6th row? (1)
iii. a. Find the total number of pairs of shoes displayed in the first 15 rows. (2)

OR

- b. If the pairs of shoes displayed in the 4th row are 'on sale' at price of ₹ 500 for each pair, then find the total amount (money) earned by Sumant's mother if all shoes displayed in the 4th row are sold out. (2)

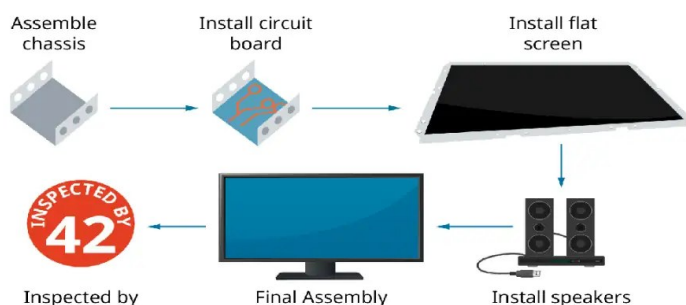
55. A school has decided to plant some endangered trees on 51st World Environment Day in the nearest park. They have decided to plant those trees in few concentric circular rows such that each succeeding row has 20 more trees than the previous one. The first circular row has 50 trees. Based on the above given information, answer the following questions: [4]

- i. How many trees will be planted in the 10th row? (1)
ii. How many more trees will be planted in the 8th row than in the 5th row? (1)
iii. a. If 3200 trees are to be planted in the park, then how many rows are required? (2)

OR

- b. If 3200 trees are to be planted in the park, then how many trees are still left to be planted after the 11th row? (2)

56. Elpis Technology is a laptop manufacturer. The company works for many branded laptop companies and also provides them with spare parts. Elpis Technology produced 6000 units in 3rd year and 7000 units in the 7th year. [4]



UNIQUE STUDY POINT

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Assuming that production increases uniformly by a fixed number every year, find

- the production in the 1st year, **(2)**
- the production in the 5th year, **(1)**
- the total production in 7 years. **(1)**

57. Jaspal Singh is an auto driver. His autorickshaw was too old and he had to spend a lot of money on repair and maintenance every now and then. One day he got to know about the EV scheme of the Government of India where he can not only get a good exchange bonus but also avail heavy discounts on the purchase of an electric vehicle. So, he took a loan of Rs.1,18,000 from a reputed bank and purchased a new autorickshaw. **[4]**



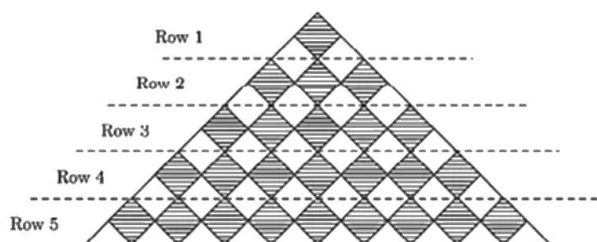
Jaspal Singh repays his total loan of 118000 rupees by paying every month starting with the first instalment of 1000 rupees.

- If he increases the installment by 100 rupees every month, then what amount will be paid by him in the 4th installment? **(1)**
- If he increases the installment by 100 rupees every month, then what amount will be paid by him in the 30th installment? **(1)**
- What is the total amount paid till 30th installment?

OR

What amount of loan does he still have to pay after 30th installment? **(2)**

58. A fashion designer is designing a fabric pattern. In each row, there are some shaded squares and unshaded triangles. **[4]**



- Identify A.P. for the number of squares in each row. **(1)**
- Identify A.P. for the number of triangles in each row. **(1)**
- If each shaded square is of side 2 cm, then find the shaded area when 15 rows have been designed. **(2)**

OR

Write a formula for finding total number of triangles in n number of rows. Hence, find S_{10} . **(2)**

59. Your friend Varun wants to participate in a 200m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds. **[4]**

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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- Write first four terms are in AP for the given situations. (1)
- What is the minimum number of days he needs to practice till his goal is achieved? (1)
- How many second takes after 5th days? (2)

OR

Out of 41, 30, 37 and 39 which term is not in the AP of the above given situation? (2)

- 60.** Students of a school thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. **[4]**



- Find total number of trees planted by primary 1 to 5 class students? (1)
- Find the total number of trees planted by the students of the school. (1)
- Find the total number of trees planted by class 10th student. (2)

OR

Find the total no of trees planted by class 12th students. (2)

- 61.** The students of a school decided to beautify the school on an 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 metre. The flags are stored at the position of the middlemost 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. **[4]**



- How much distance did she cover in pacing 6 flags on either side of center point? (1)
- Represent above information in Arithmetic progression. (1)
- How much distance did she cover in completing this job and returning to collect her books? (2)

OR

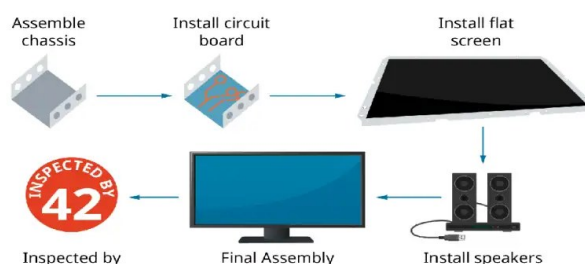
What is the maximum distance she travelled carrying a flag? (2)

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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- 62.** Elpis Technology is a laptop manufacturer. The company works for many branded laptop companies and also provides them with spare parts. Elpis Technology produced 6000 units in 3rd year and 7000 units in the 7th year. **[4]**



Assuming that production increases uniformly by a fixed number every year.

- i. Find the production in the 1st year. (1)
- ii. Find the production in the 5th year. (1)
- iii. Find the total production in 7 years. (2)

OR

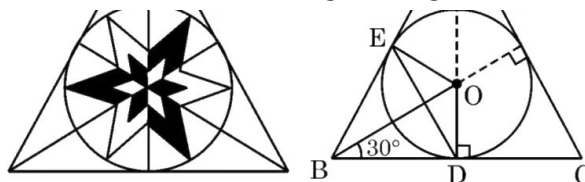
Find in which year 10000 units are produced? (2)



SECTION - F : TRIANGLES

This section consists of 13 case based questions of 4 marks each.

- 63.** In a Fine Arts class, students were asked to design triangular tiles in geometric pattern. **[4]**



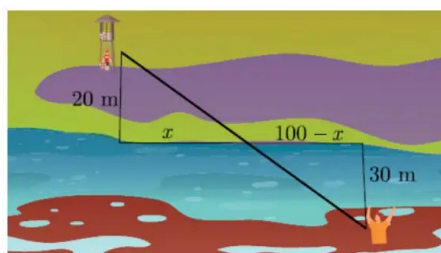
Neelima made a circular design inside an equilateral triangle ABC. The radius of the circle is 4 cm. Observe the diagram and answer the following questions:

- i. Determine the length OB. **(1)**
- ii. Is $DE \parallel CA$? Give reason for your answer. **(1)**
- iii. a. Write all angles of quadrilateral OEBD and show that it is a cyclic quadrilateral. **(2)**

OR

- b. Find the perimeter of $\triangle ABC$. (Use $\sqrt{3} = 1.73$) **(2)**

- 64. Swimmer in Distress:** A lifeguard located 20 metre from the water spots a swimmer in distress. The swimmer is 30 metre from shore and 100 metre east of the lifeguard. Suppose the lifeguard runs and then swims to the swimmer in a direct line, as shown in the figure. **[4]**



UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

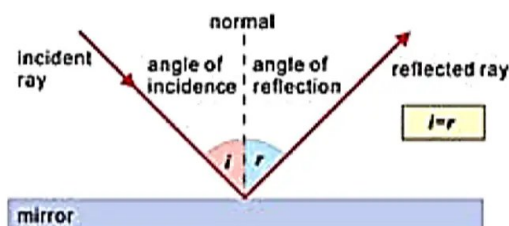
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- How far east from his original position will he enter the water? (Hint: Find the value of x in the sketch.) (1)
- Which similarity criterion of triangle is used? (1)
- What is the distance of swimmer from the shore? (2)

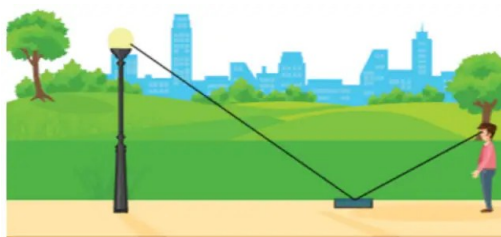
OR

What is the length of AD? (2)

65. The law of reflection states that when a ray of light reflects off a surface, the angle of incidence is equal to the angle of reflection. [4]



Suresh places a mirror on level ground to determine the height of a pole (with traffic light fired on it). He stands at a certain distance so that he can see the top of the pole reflected from the mirror. Suresh's eye level is 1.5 m above the ground. The distance of Suresh and the pole from the mirror are 1.8 m and 6 m respectively.

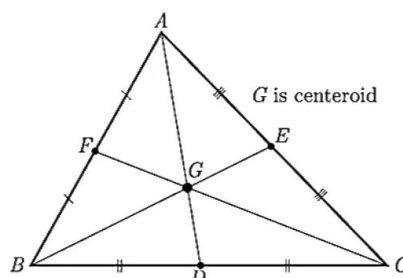


- Which criterion of similarity is applicable to similar triangles? (1)
- What is the height of the pole? (1)
- If angle of incidence is i , find $\tan i$. (2)

OR

Now Suresh move behind such that distance between pole and Suresh is 13 meters. He place mirror between him and pole to see the reflection of light in right position. What is the distance between mirror and Suresh? (2)

66. The centroid is the centre point of the object. It is also defined as the point of intersection of all the three medians. The median is a line that joins the midpoint of a side and the opposite vertex of the triangle. The centroid of the triangle separates the median in the ratio of 2 : 1. It can be found by taking the average of x-coordinate points and y-coordinate points of all the vertices of the triangle. See the figure given below [4]



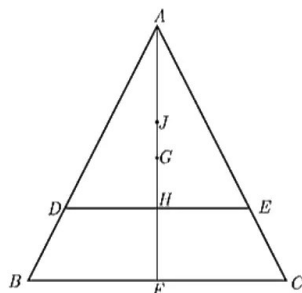
Here D, E and F are mid points of sides BC, AC and AB in same order. G is centroid, the centroid divides the median in the ratio 2 : 1 with the larger part towards the vertex. Thus $AG : GD = 2 : 1$

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On the basis of above information read the question below. If G is Centroid of $\triangle ABC$ with height h and J is Centroid of $\triangle ADE$. Line DE parallel to BC, cuts the $\triangle ABC$ at a height $\frac{h}{4}$ from BC. $HF = \frac{h}{4}$

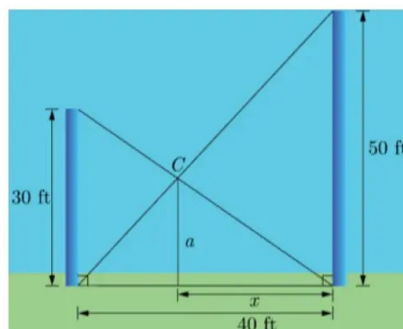


- What is the length of AH? (1)
- What is the distance of point A from point G? (1)
- What is the distance of point A from point J? (2)

OR

What is the distance GJ? (2)

67. Two poles, 30 feet and 50 feet tall, are 40 feet apart and perpendicular to the ground. The poles are supported by wires attached from the top of each pole to the bottom of the other, as in the figure. A coupling is placed at C where the two wires cross. [4]

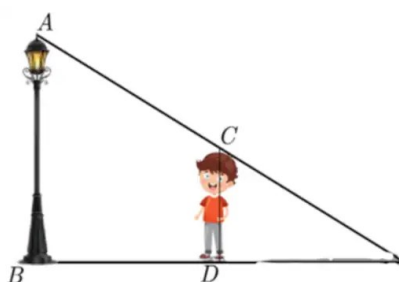


- What is the horizontal distance from C to the taller pole? (1)
- How high above the ground is the coupling? (1)
- How far down the wire from the smaller pole is the coupling? (2)

OR

Find the length of line joining the top of the two poles. (2)

68. Priyanshu is very intelligent in maths. He always try to relate the concept of maths in daily life. One day he is walking away from the base of a lamp post at a speed of 1 m/s. Lamp is 4.5 m above the ground. [4]



- If after 2 second, length of shadow is 1 meter, what is the height of Priyanshu? (1)
- What is the minimum time after which his shadow will become larger than his original height? (1)

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iii. What is the distance of Priyanshu from pole at this point? (2)

OR

What will be the length of his shadow after 4 seconds? (2)

69. Observe the figures given below carefully and answer the questions:

[4]

Figure A

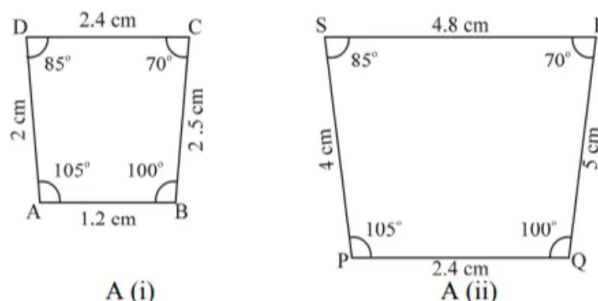
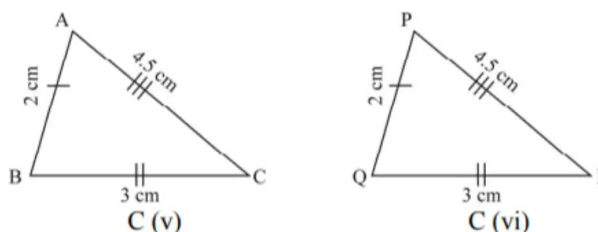


Figure B Figure C



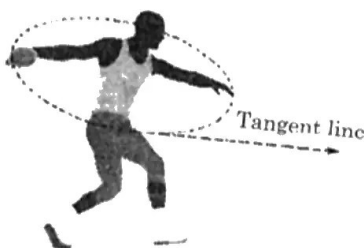
- Name the figure(s) where in two figures are similar. (1)
- Name the figure(s) wherein the figures are congruent. (1)
- Prove that congruent triangles are also similar but not the converse. (2)

OR

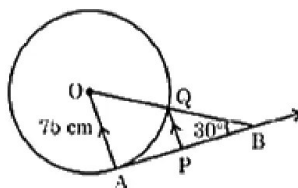
What more is least needed for two similar triangles to be congruent? (2)

70. The discus throw is an event in which an athlete attempts to throw a discus. The athlete spins anti-clockwise around one and a half times through a circle, then releases the throw. When released, the discus travels along tangent to the circular spin orbit.

[4]



In the given figure, AB is one such tangent to a circle of radius 75 cm. Point O is centre of the circle and $\angle ABO = 30^\circ$. PQ is parallel to OA.



- find the length of AB. (1)
- find the length of OB. (1)
- find the length of AP. (2)

OR

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find the length of PQ. (2)

71. Veena wants to make the curtains for her window as shown in the figure. The window is in the shape of a rectangle, whose width and height are in the ratio 2 : 3. The area of the window is 9600 square cm. [4]



- What is the shape of the window that is uncovered? (1)
- What will be the ratio of two sides of each curtain (other than hypotenuse)? (1)
- What are the dimensions of the window? (2)

OR

What will be the perimeter of the window? (2)

72. **Statue of a Pineapple:** The Big Pineapple is a heritage-listed tourist attraction at Nambour Connection Road, Woombye, Sunshine Coast Region, Queensland, Australia. It was designed by Peddle Thorp and Harvey, Paul Luff, and Gary Smallcombe and Associates. It is also known as Sunshine Plantation. It was added to the Queensland Heritage Register on 6 March 2009. [4]

Kavita last year visited Nambour and wanted to find the height of a statue of a pineapple. She measured the pineapple's shadow and her own shadow. Her height is 156 cm and casts a shadow of 39 cm. The length of shadow of pineapple is 4 m.



- What is the height of the pineapple? (1)
- What is the height Kavita in metres? (1)
- Write the type of triangles used to solve this problem. (2)

OR

Which similarity criterion of triangle is used? (2)

73. Ashok wanted to determine the height of a tree on the corner of his block. He knew that a certain fence by the tree was 4 feet tall. At 3 PM, he measured the shadow of the fence to be 2.5 feet tall. Then he measured the tree's shadow to be 11.3 feet. [4]



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- i. What is the height of the tree? (1)
- ii. What will be length of shadow of tree at 12:00 pm? (1)
- iii. Write the name triangle formed for this situation. (2)

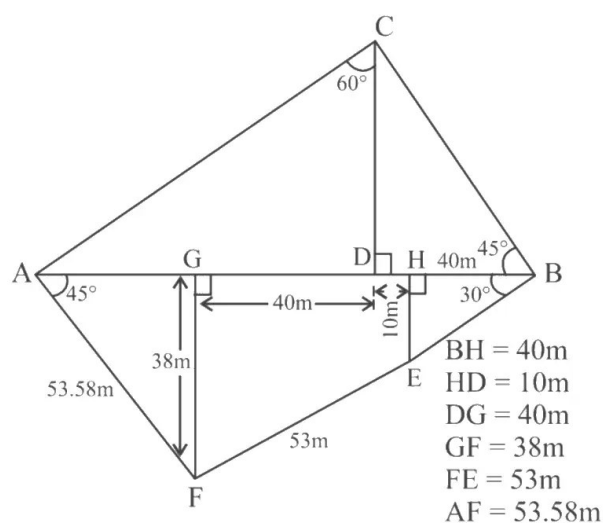
OR

What will be the length of wall at 12:00 pm? (2)

- 74.** Rahim and Nadeem are two friends whose plots are adjacent to each other. Rahim's son made a drawing of the plots with necessary details. **[4]**

It is decided that Rahim will fence the triangular plot ABC and Nadeem will fence along the sides AF, FE and BE.

Observe the diagram carefully and answer the following questions:



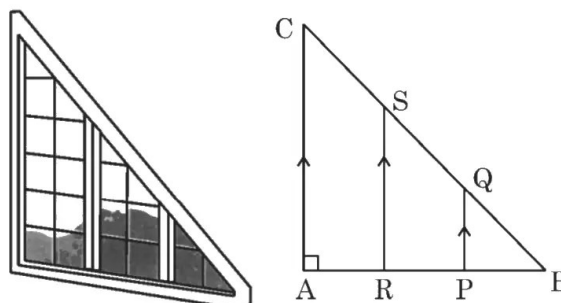
(Use $\sqrt{2} = 1.41$ and $\sqrt{3} = 1.73$)

- i. Find length BC. **(1)**
- ii. Find length AG. **(1)**
- iii. a. Calculate perimeter of $\triangle ABC$. **(2)**

OR

b. Calculate length of $(AF + FE + EB)$. **(2)**

- 75.** A triangular window of a building is shown below. Its diagram represents a $\triangle ABC$ with $\angle A = 90^\circ$ and $AB = AC$. Points P and R trisect AB and $PQ \parallel RS \parallel AC$. **[4]**



Based on the above, answer the following questions:

- i. Show that $\triangle BPQ \sim \triangle BAC$. **(1)**
- ii. Prove that $PQ = \frac{1}{3}AC$. **(1)**

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iii. a. If $AB = 3\text{ m}$, find length BQ and BS. Verify that $BQ = \frac{1}{2}BS$. (2)

OR

b. Prove that $BR^2 + RS^2 = \frac{4}{9}BC^2$. (2)

SECTION - G : COORDINATE GEOMETRY

This section consists of 25 case based questions of 4 marks each.

76. To raise social awareness about the hazards of smoking, a school decided to start a 'No smoking' campaign. 10 students are asked to prepare campaign banners in the shape of a triangle. The vertices of one of the triangles are P(-3, 4), Q(3, 4) and R(-2, -1). [4]

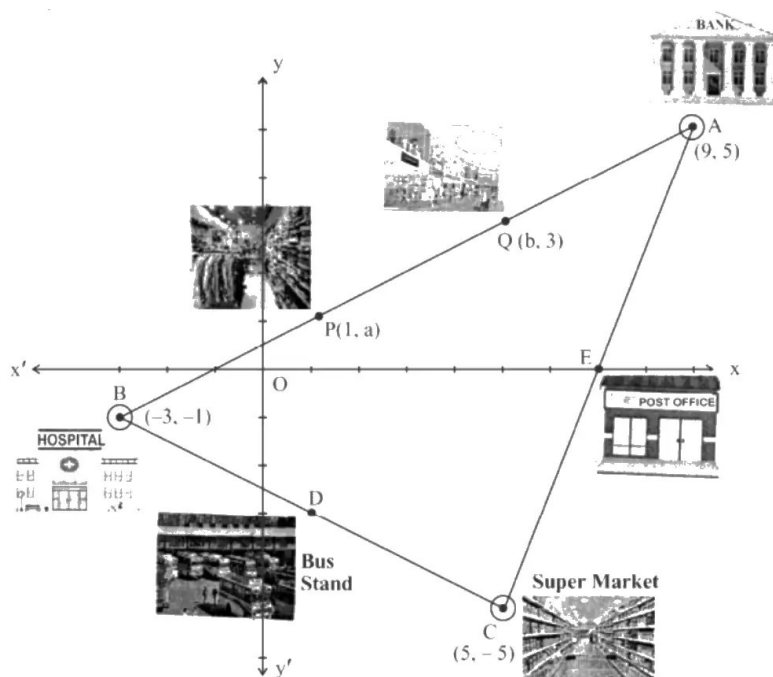


- What are the coordinates of the centroid of $\triangle PQR$? (1)
- If T be the mid-point of the line joining R and Q, then what are the coordinates of T? (1)
- If U be the mid-point of line joining R and P, then what are the coordinates of U? (2)

OR

What are the coordinates of centroid of $\triangle STU$? (2)

77. Partha, a software engineer, lives in Jerusalem for his work. He lives in the most convenient area of the city from where bank, hospital, post office and supermarket can be easily accessed. In the graph, the bank is plotted as A(9,5), hospital as B(-3,-1) and supermarket as C(5,-5) such that A,B,C form a triangle. [4]



Based on the above given information, answer the following questions:

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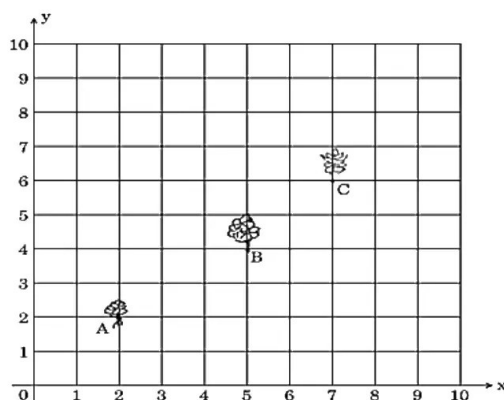
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- i. Find the distance between the bank and the hospital. **(1)**
- ii. In between the bank and the supermarket, there is a post office plotted at E which is their mid-point. Find the coordinates of E. **(1)**
- iii. a. In between the hospital and the supermarket, there is a bus stop plotted as D, which is their mid-point. If Partha wants to reach the bus stand from the bank, then how much distance does he need to cover? **(2)**

OR

- b. P and Q are two different garment shops lying between the bank and the hospital, such that $BP = PQ = QA$. If the coordinates of P and Q are $(1, a)$ and $(b, 3)$ respectively, then find the values of 'a' and 'b'. **(2)**

- 78.** Reena has a $10\text{ m} \times 10\text{ m}$ kitchen garden attached to her kitchen. She divides it into a 10×10 grid and wants to grow some vegetables and herbs used in the kitchen. She puts some soil and manure in that and sow a green chilly plant at A, a coriander plant at B and a tomato plant at C. Her friend Kavita visited the garden and praised the plants grown there. She pointed out that they seem to be in a straight line. See the below diagram carefully: **[4]**



- i. Find the distance between A and B? **(1)**
- ii. Find the mid-point of the distance AB? **(1)**
- iii. Find the distance between B and C? **(2)**

OR

Find the mid point of BC. **(2)**

- 79.** The top of a table is hexagonal in shape. **[4]**

On the basis of the information given above, answer the following questions:

- i. Write the coordinates of A and B.
- ii. Write the coordinates of the mid-point of line segment joining C and D.
- iii. a. Find the distance between M and Q.

OR

- b. Find the coordinates of the point which divides the line segment joining M and N in the ratio 1:3 internally.

- 80.** There are two routes to travel from source A to destination B by bus. First bus reaches at B via point C and second bus reaches from A to B directly. The position of A, B and C are represented in the following graph: **[4]**

Based on the above information, answer the following questions.

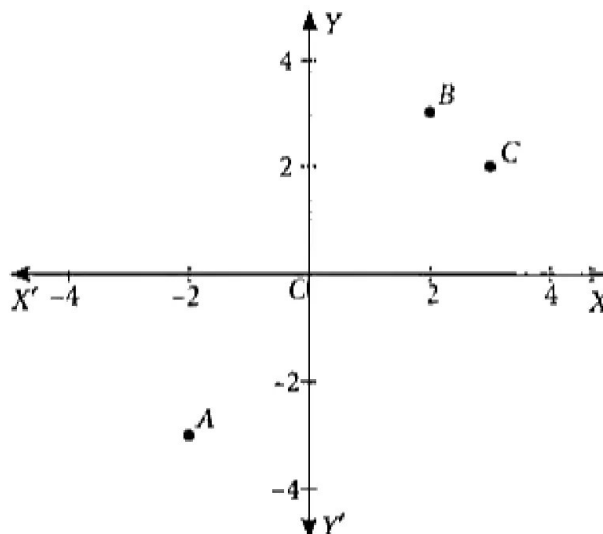


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Scale: x-axis : 1 unit = 1 km y-axis: 1 unit = 1 km



- If the fare for the second bus is ₹15/km, then what will be the fare to reach to the destination by this bus? (1)
- What is the distance between A and B? (1)
- What is the distance between A and C? (2)

OR

If it is assumed that both buses have same speed, then by which bus do you want to travel from A to B? (2)

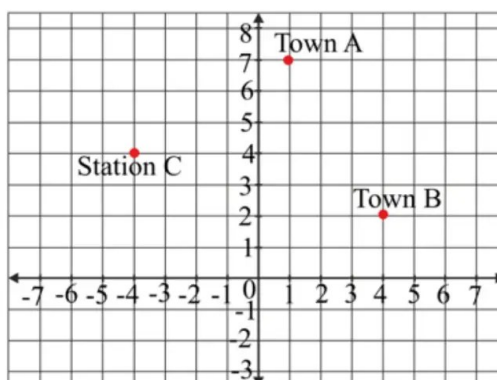
- 81.** Using Cartesian Coordinates we mark a point on a graph by how far along and how far up it is. The left-right (horizontal) direction is commonly called X-axis. **[4]**

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

When we include negative values, the x and y axes divide the space up into 4 pieces.

Read the information given above and below:

Two friends Veena and Arun work in the same office in Delhi. In the Christmas vacations, both decided to go their hometowns represented by Town A and Town B respectively in the figure given below. Town A and Town B are connected by trains from the same station C (in the given figure) in Delhi.



- Who will travel more distance to reach their home? (1)
- Find the location of the station. (1)
- Find in which ratio Y-axis divide Town B and Station. (2)

OR

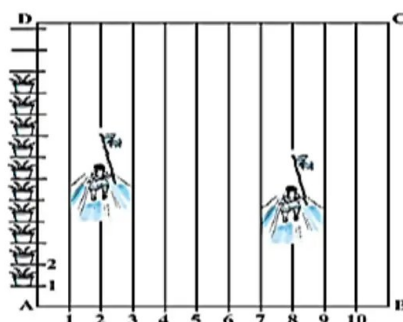
Find the distance between Town A and Town B. (2)

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- 82.** To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD, as shown in Fig. Sarika runs the distance AD on the 2nd line and posts a green flag. Priya runs the distance AD on the eighth line and posts a red flag. (take the position of feet for calculation) **[4]**

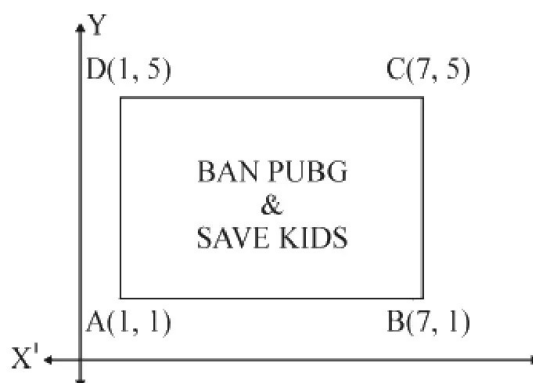


- What co-ordinates you will use for Green Flag? (1)
- What is the distance between the green flag and the red flag? (1)
- If Monika wants to post a blue flag adjacently in between these two flags. Where she will post a blue flag? (2)

OR

What is the distance between green and blue flag? (2)

- 83.** Use of mobile screen for long hours makes your eye sight weak and give you headaches. **[4]**
Children who are addicted to play “PUBG” can get easily stressed out. To raise social awareness about ill effects of playing PUBG, a school decided to start ‘BAN PUBG’ campaign, in which students are asked to prepare campaign board in the shape of a rectangle. One such campaign board made by class X student of the school is shown in the figure.



- Find the coordinates of the point of intersection of diagonals AC and BD. (1)
- Find the length of the diagonal AC. (1)
- Find the area of the campaign Board ABCD. (2)

OR

Find the ratio of the length of side AB to the length of the diagonal AC. (2)

- 84.** The design of Christmas tree is shown in the following graph: **[4]**
- What is the distance of point A from x-axis? (1)
 - What is the Length of BC? (1)
 - What is the Length of FG? (2)

OR

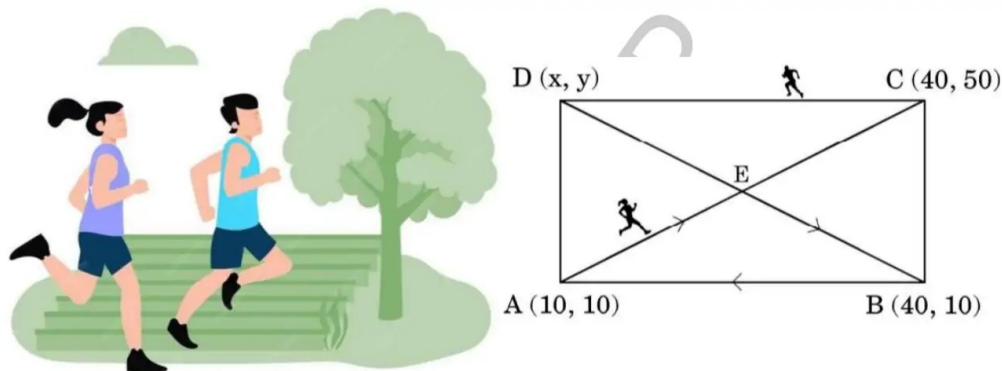
What is the perimeter of its trunk LMPN? (2)

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- 85.** A field is in the form of a rectangle. The coordinates of the rectangular field ABCD are $A(10,10)$, $B(40,10)$, $C(40,50)$ and $D(x,y)$. Anil and Anita, two friends decided to have a race. Anita started from point A and moved to point E along the diagonal AC, where E is the point of intersection of both the diagonals of ABCD. From point E, she moved to point B along the other diagonal DB and then moved back to point A along BA. While Anil started from point C and ran to point A via D along the boundary of the field. **[4]**



Based on the above information, answer the following questions:

- Find the coordinates of point E. **(1)**
- Find the distance between the points B and C. **(1)**
- a. Find the coordinates of point D and the distance BD. **(2)**

OR

- b. Find the total distance travelled by Anita. **(2)**

- 86.** The Chief Minister of Delhi launched the, 'Switch Delhi', an electric vehicle mass awareness campaign in the National Capital. The government has also issued tenders for setting up 100 **[4]**

charging stations across the city. Each station will have five charging points. For demo charging

station is set up along a straight line and has charging points at $A\left(-\frac{7}{3}, 0\right)$, $B\left(0, \frac{7}{4}\right)$, $C(3, 4)$,

$D(7, 7)$ and $E(x, y)$. Also, the distance between C and E is 10 units.



- What is the distance DE? **(1)**
- What is the value of $x + y$? **(1)**
- Points C, D, E are collinear or not? **(2)**

OR

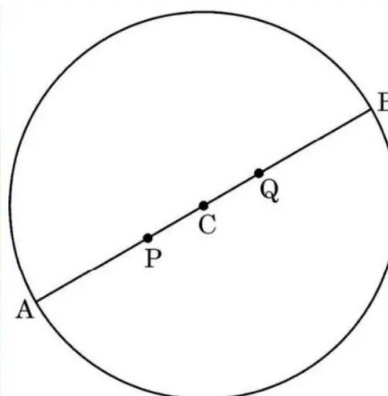
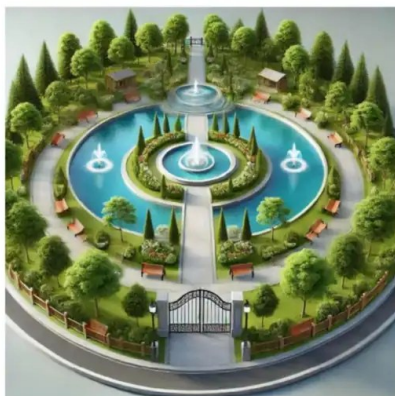
What is the ratio in which B divides AC? **(2)**

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- 87.** In a society, there is a circular park having two gates. The gates are placed at points $A(10,20)$ and $B(50,50)$, as shown in the figure below. Two fountains are installed at points P and Q on AB such that $AP = PQ = QB$. **[4]**



Based on the above information, answer the following questions:

- i. Find the coordinates of the centre C . **(1)**
- ii. Find the radius of the circular park. **(1)**
- iii. a. Find the coordinates of the point P . **(2)**

OR

- b. Find the distance of the fountain at Q from gate A . **(2)**

- 88.** In an examination hall, students are seated at a distance of 2 m from each other, to maintain the social distance due to CORONA virus pandemic. Let three students sit at points A , B and C whose coordinates are $(4, -3)$, $(7, 3)$ and $(8, 5)$ respectively. **[4]**



- i. What is the distance between A and C ? **(1)**
- ii. If an invigilator at point I , lying on the straight line joining B and C such that it divides the distance between them in the ratio of $1 : 2$. Then what are the coordinates of I (invigilator)? **(1)**
- iii. What is the mid-point of the line segment joining A and C ? **(2)**

OR

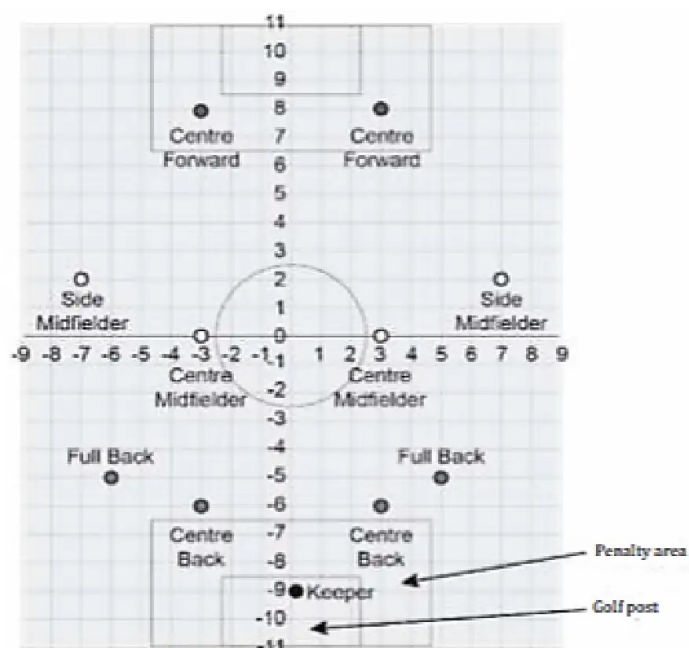
What is the ratio in which B divides the line segment joining A and C ? **(2)**

- 89.** Ronit is the captain of his school football team. He has decided to use a 4-4-2-1 formation in the next match. The figure below shows the positions of the players in a 4-4-2-1 formation on a coordinate grid. **[4]**

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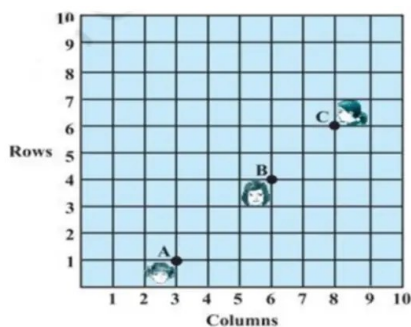


One square box represents 1 square unit.

- i. What is the area of the middle circle?
- ii. A ball hit from the left centre midfielder position touches the point (2, 11). Does the ball enter the goal post? Justify your answer.
- iii. What are the coordinates of the point on the y-axis which is equidistant from the left centre forward and the right centre midfielder positions?
 - a. (0, 0)
 - b. (0, 2)
 - c. (0, 4)
 - d. (0, 8)
- iv. What is the measure of the penalty area for one team?
 - a. 10 m^2
 - b. 17 m^2
 - c. 25 m^2
 - d. 29.25 m^2

- 90.** There is a function in the school. Anishka, Bhawna and Charu are standing in a rectangular ground at points A, B and C respectively as shown in the figure. They are ready to perform an aerobic dance.

[4]



- i. How far is Charu from y-axis? (1)
- ii. Find distance between Anishka and Bhawna. (1)
- iii. Check whether $AB + BC = AC$? (2)

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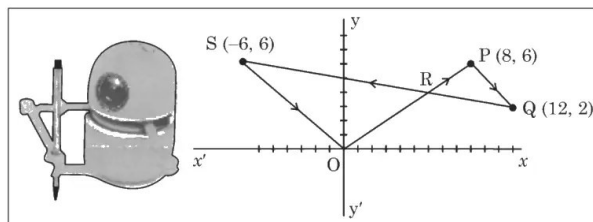
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OR

Is A, B and C lies in a straight line? (2)

91. Gurveer and Arushi built a robot that can paint a path as it moves on a graph paper. Some co-ordinate of points are marked on it. It starts from (0,0), moves to the points listed in order (in straight lines) and ends at (0, 0). [4]



Arushi entered the points $P(8,6)$, $Q(12,2)$ and $S(-6,6)$ in order. The path drawn by robot is shown in the figure.

Based on the above, answer the following questions:

- Determine the distance OP. (1)
- QS is represented by equation $2x + 9y = 42$. Find the co-ordinates of the point where it intersects y-axis. (1)
- a. Point $R(4.8, y)$ divides the line segment OP in a certain ratio, find the ratio. Hence, find the value of y. (2)

OR

b. Using distance formula, show that $\frac{PQ}{OS} = \frac{2}{3}$. (2)

92. A garden is in the shape of a square. The gardener grew saplings of Ashoka tree on the boundary of the garden at the distance of 1 m from each other. He wants to decorate the garden with rose plants. He chose a triangular region inside the garden to grow rose plants. In the above situation, the gardener took help from the students of class 10. They made a chart for it which looks like the given figure. [4]

Based on the above, answer the following questions:

- If A is taken as origin, what are the coordinates of the vertices of $\triangle PQR$? (1)
- a. Find distances PQ and QR. (2)

OR

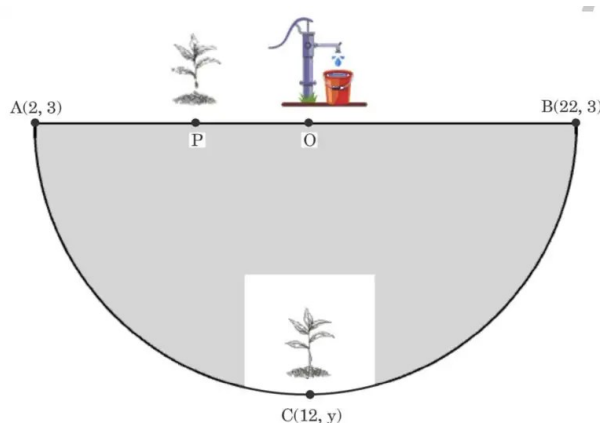
- b. Find the coordinates of the point which divides the line segment joining points P and R in the ratio 2 : 1 internally. (2)
- iii. Find out if $\triangle PQR$ is an isosceles triangle. (1)

93. There is a semicircular park in Aman's society. He wishes to plant saplings along the boundary of the park. There is a borewell at the centre O of the park along the diameter AB as shown in the figure below. [4]

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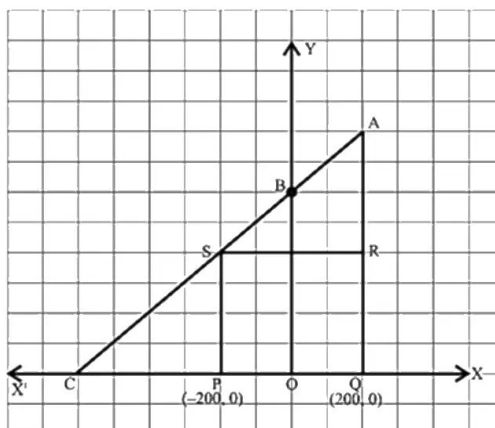
Based on the above information, answer the following questions:

- i. Find the coordinates of point O. **(1)**
- ii. Find the radius of the semicircular park. **(1)**
- iii. a. One sapling is kept at point C(12,y). Find the coordinates of C. **(2)**

OR

- b. One sapling is kept at point P along AB so that $PA = \frac{1}{3} PB$. Find the coordinates of P. **(2)**

- 94.** Jagdish has a field which is in the shape of a right angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables (as shown in the figure). In the field, there is a pole marked as O. **[4]**



- i. Taking O as origin, coordinates of P are (-200, 0) and of Q are (200, 0). PQRS being a square, what are the coordinates of R and S? **(1)**
- ii. What is the area of square PQRS? **(2)**

OR

What is the length of diagonal PR in square PQRS? **(2)**

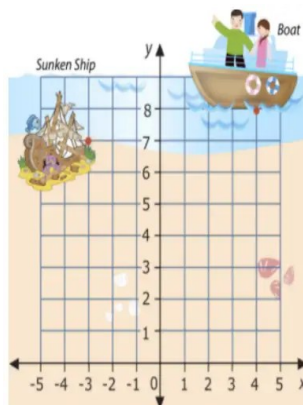
- iii. If S divides CA in the ratio K : 1, what is the value of K, where point A is (200, 800)? **(1)**

- 95.** Mary and John are very excited because they are going to go on a dive to see a sunken ship. The dive is quite shallow which is unusual because most sunken ship dives are found at depths that are too deep for two junior divers. However, this one is at 40 feet, so the two divers can go to see it. **[4]**

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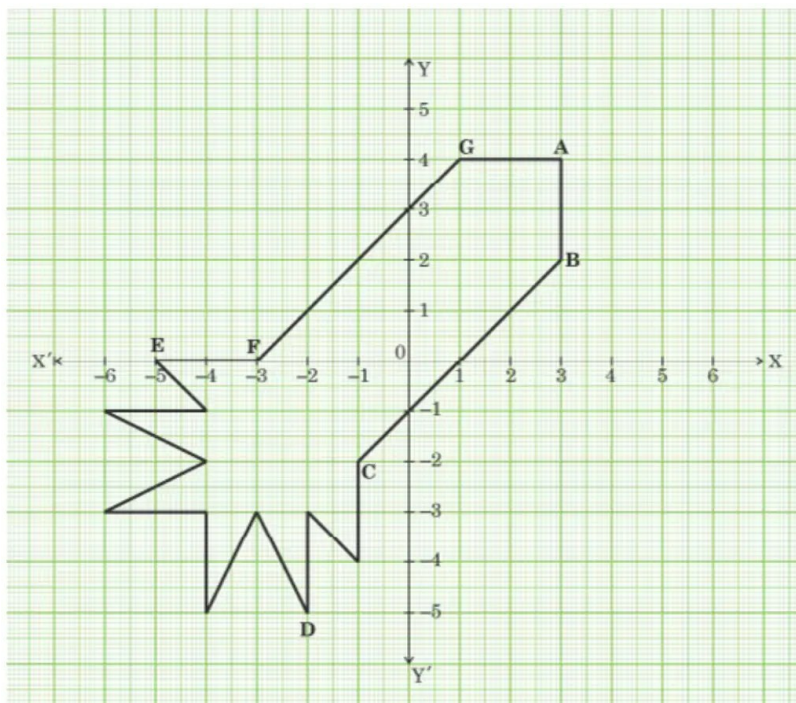
They have the following map to chart their course. John wants to figure out exactly how far the boat will be from the sunken ship. Use the information in this lesson to help John figure out the following.

- What are the coordinates of the boat and the sunken ship respectively? (1)
- How much distance will Mary and John swim through the water from the boat to the sunken ship? (1)
- If each square represents 160 cubic feet of water, how many cubic feet of water will Mary and John swim through from the boat to the sunken ship? (2)

OR

If the distance between the points $(x, -1)$ and $(3, 2)$ is 5, then what is the value of x ? (2)

- 96.** Ryan, from a very young age, was fascinated by the twinkling of stars and the vastness of space. He always dreamt of becoming an astronaut one day. So he started to sketch his own rocket designs on the graph sheet. One such design is given below: **[4]**



Based on the above, answer the following questions:

- Find the mid-point of the segment joining F and G. (1)
- a. What is the distance between the points A and C? (2)

OR

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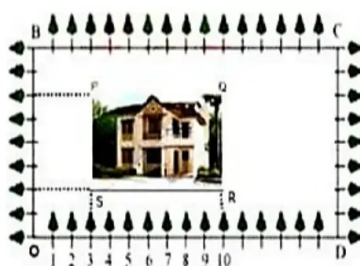
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- b. Find the coordinates of the point which divides the line segment joining the points A and B in the ratio 1 : 3 internally. (2)
- iii. What are the coordinates of the point D? (1)

97. 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. [4]

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.

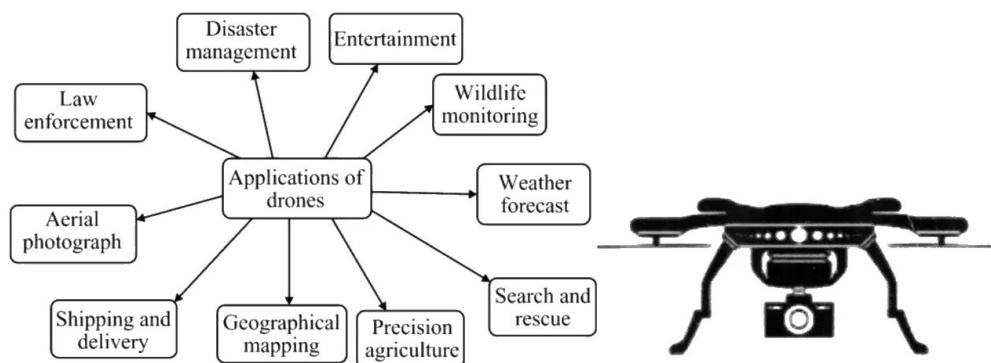


- i. Find the coordinates of the midpoints of the diagonal QS. (1)
- ii. Find the length and breadth of rectangle PQRS? (1)
- iii. Find Area of rectangle PQRS. (2)

OR

Find the diagonal of rectangle. (2)

98. Drones are used by military for surveillance purposes. These days, drones are also used by individual entrepreneurs, SMEs and large companies to accomplish various other tasks. [4]



A drone is flying over a rectangular field with vertices at $A(-100,0)$, $B(100,0)$, $C(100,150)$ and $D(-100,150)$. The drone captures an image at a location (x,y) .

Based on the above information, answer the following questions:

- i. Find the dimensions of the rectangular field. (1)
- ii. Find the distance between points A and C. (1)
- iii. i. If a drone captures the image of an object $P(x,y)$ on the rectangular field, find the relation between x and y such that $PA = PC$. (2)

OR

- ii. If a drone captures the image of an object at a point Q whose x coordinate is 0 and it is equidistant from points A and D, find the coordinates of Q. (2)

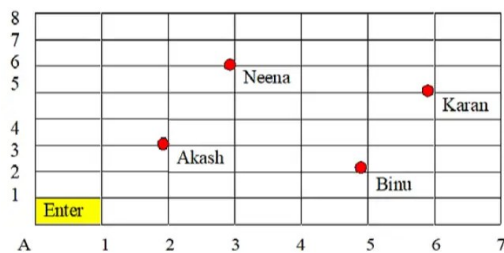
99. Karan went to the Lab near to his home for COVID 19 test along with his family members. [4]

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The seats in the waiting area were as per the norms of distancing during this pandemic (as shown in the figure). His family member took their seats surrounded by red circular area.



- What is the distance between Neena and Karan? (1)
- What are the coordinates of seat of Akash? (1)
- What will be the coordinates of a point exactly between Akash and Binu where a person can be? (2)

OR

Find distance between Binu and Karan. (2)

- 100.** A satellite image of a colony is shown below. In this view, a particular house is pointed out by a flag, which is situated at the point of intersection of x and y-axes. If we go 2 cm east and 3 cm north from the house, then we reach to a Grocery store. If we go 4 cm west and 6 cm south from the house, then we reach to an Electricians's shop. If we go 6 cm east and 8 cm south from the house, then we reach to a food cart. If we go 6 cm west and 8 cm north from the house, then we reach a bus stand. [4]

Scale:

x-axis : 1 cm = 1 unit y-axis : 1 cm = 1 unit



- What is the distance between the grocery store and food cart? (1)
- What is the distance of the bus stand from the house? (1)
- If the grocery store and electricians shop lie on a line, then what will be the ratio of distance of house from grocery store to that from electrician's shop? (2)

OR

What are the ratio of distances of the house from bus stand to food cart? (2)

SECTION - H : TRIGONOMETRY AND ITS APPLICATIONS

This section consists of 30 case based questions of 4 marks each.

- 101.** Akshat studies in DAV Public school, Vasant Kunj, Delhi. During summer vacation he went to his native place in a village. His grandfather took him to the bank of a nearby river. Akshat was very happy to see the pollution free environment near the river. He was standing on the bank of the river He thought to measure the width of the river. He found that the angle of elevation of the top of a tree standing on the opposite bank was 60° . When he moved 30 m away from the river the angle of elevation reduced to 30° . [4]

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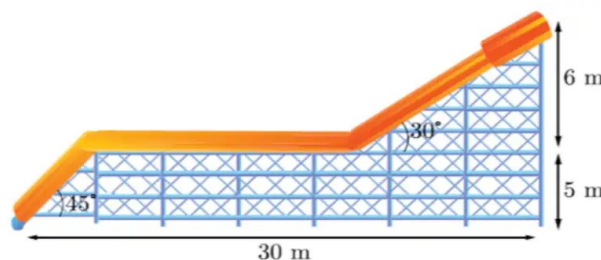
- What is the height of the tree? (1)
- What is the width of the river? (1)
- After moving how much distance away from the river the angle of elevation becomes 45° . (2)

OR

If the width of the river were 40 m then what would be the height of the tree selected? (2)

102. Water Slide Design: Slide shown in the figure is part of a design for a water slide. [4]

(Use $\sqrt{2} = 1.41$ and $\sqrt{3} = 1.73$)



- What is the length of flat part of slide. (1)
- Which inclined part is more comfortable for small children? (1)
- What is the total length of the slide? (2)

OR

If there is only one slide in the water slide design. What will be its length? (2)

103. A heavy-duty ramp is used to winch heavy appliances from street level up to a warehouse loading dock. If the ramp is 2 meter high and the incline is 4 meter long. [4]

(Use $\sqrt{3} = 1.73$)



- What angle does the dock make with the street? (1)
- How long is the base of the ramp? (In round figure) (1)

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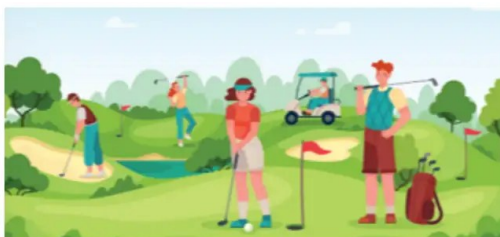
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iii. If the ramp is inclined at the angle of 45° , what is the height of the ramp? Use $\sqrt{2} = 1.41$ (2)

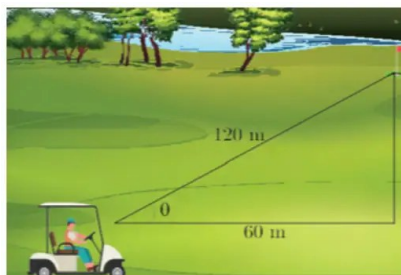
OR

If the ramp is inclined at an angle of 45° , what is the length of ramp? (2)

- 104.** Golf is a game played in an open field where the golfer plays his golf ball into a hole by using different types of clubs (golf instruments). In golf, a golfer plays a number of holes in a given order. 18 holes played in an order controlled by the golf course design, normally make up a game. **[4]**



On your approach shot to the ninth green, the Global Positioning System (GPS) your cart is equipped with tells you the pin is 120 meter away.



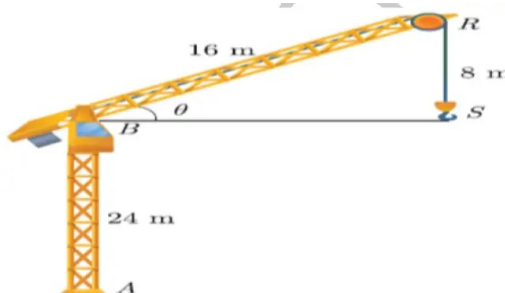
- The distance plate states the straight line distance to the hole is 60 meter. Relative to a straight line between the plate and the hole, at what acute angle should you hit the shot? (1)
- What is the value of the tangent of the above angle? (1)
- What is the length of the side opposite to the angle θ in the given picture? (2)

OR

What is the value of tangent of angle A? (2)

- 105.** Tower cranes are a common fixture at any major construction site. They're pretty hard to miss - they often rise hundreds of feet into the air, and can reach out just as far. The construction crew uses the tower crane to lift steel, concrete, large tools like acetylene torches and generators, and a wide variety of other building materials. **[4]**

A crane stands on a level ground. It is represented by a tower AB, of height 24 m and a jib BR. The jib is of length 16 m and can rotate in a vertical plane about B. A vertical cable, RS, carries a load S. The diagram shows current position of the jib, cable and load.



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- What is the distance BS? (1)
- What is the angle that the jib, BR, makes with the horizontal? (1)
- What is the distance between the points A and S? (2)

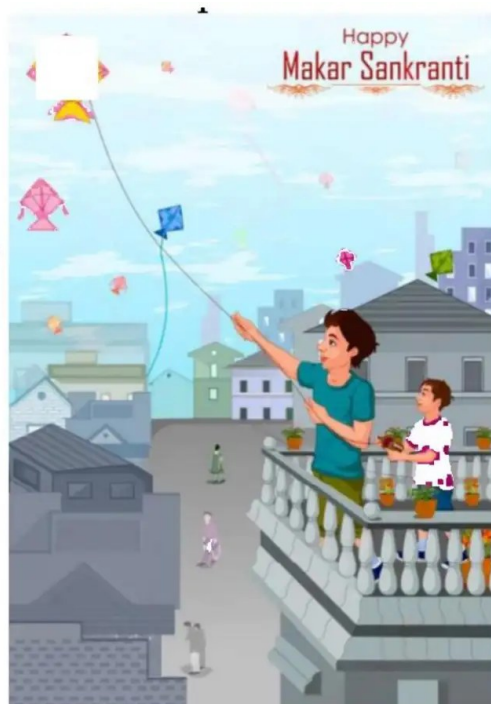
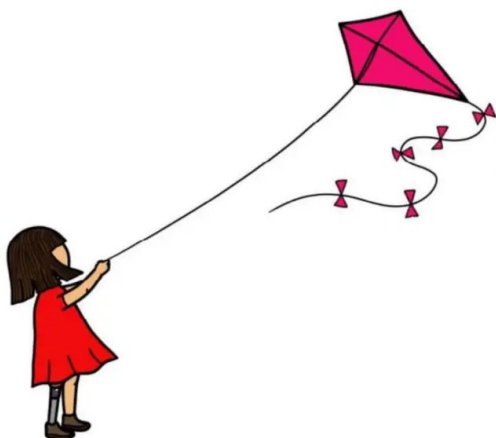
OR

Find the angle that the crane makes with the line AS. (2)

- 106.** Akshat is a class 10 student. He went to his grandparent's home in a village. His grandfather took him to the bank of a nearby river. Akshat was very happy to see the pollution-free village environment. He was standing on the bank of the river observed that the angle of elevation of the top of a tree standing on the opposite bank was 60° . When he moved 30 metres away from the bank, he found the angle of elevation to be 30° . **[4]**

- Find the height of the tree.
- Find the width of the river. [Take $\sqrt{3} = 1.732$.]

- 107.** Kite festival is a popular festival in India which takes place during Makar Sankranti. The festival is celebrated by people flying kites from their rooftops. Reena and Ravi are also flying kites to enjoy the festival. The height of Reena's kite is 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground, and the inclination of the string with the ground is 30° . Ravi is flying a kite from a 10 m high building. His kite is also flying 60 m above the ground and the length of the string used by Ravi is same as that of Reena's. θ is the angle of elevation of Ravi's kite from a point on the rooftop. **[4]**



Based on the above information, answer the following questions:

- Find the length of string used by Reena. **(1)**

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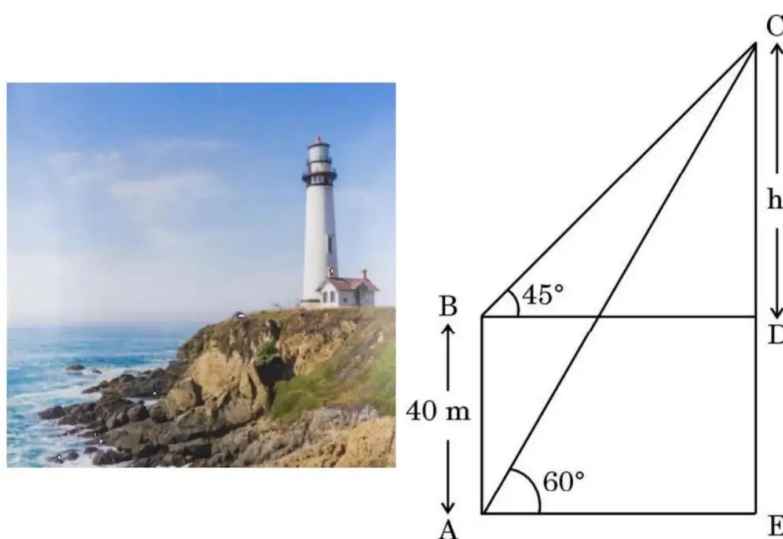
- ii. Find the value of $\sin\theta$. (1)
- iii. a. If θ changes to 60° , without changing the length of the string, what will be the height of

Ravi's kite above the ground? (Use $\sqrt{3} = 1.7$) (2)

OR

- b. What would have been the height of Ravi's kite above the ground, if the string had an inclination of 30° with the ground, assuming that the length of the string does not change? (2)

- 108.** Amrita stood near the base of a lighthouse, gazing up at its towering height. She measured the angle of elevation to the top and found it to be 60° . Then, she climbed a nearby observation deck, 40 metres higher than her original position and noticed the angle of elevation to the top of lighthouse to be 45° . [4]



Based on the above given information, answer the following questions:

- i. If CD is h metres, find the distance BD in terms of ' h '. (1)
- ii. Find distance BC in terms of ' h '. (1)
- iii. a. Find the height CE of the lighthouse [Use $\sqrt{3} = 1.73$] (2)

OR

- b. Find distance AE, if $AC = 100$ m. (2)

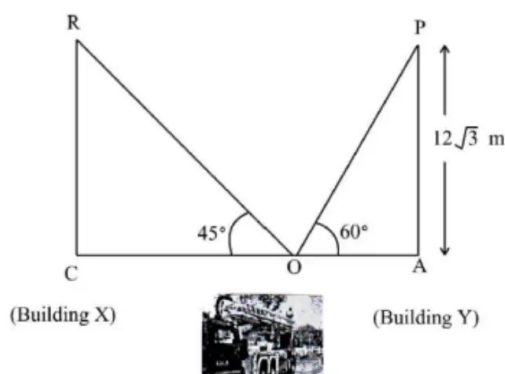
- 109.** Due to short circuit, a fire has broken out in New Home Complex. Two buildings, namely X and Y have mainly been affected. The fire engine has arrived and it has been stationed at a point which is in between the two buildings. A ladder at point O is fixed in front of the fire engine. [4]

The ladder inclined at an angle 60° to the horizontal is leaning against the wall of the terrace (top) of the building Y. The foot of the ladder is kept fixed and after some time it is made to lean against the terrace (top) of the opposite building X at an angle of 45° with the ground. Both the buildings along with the foot of the ladder, fixed at 'O' are in a straight line.

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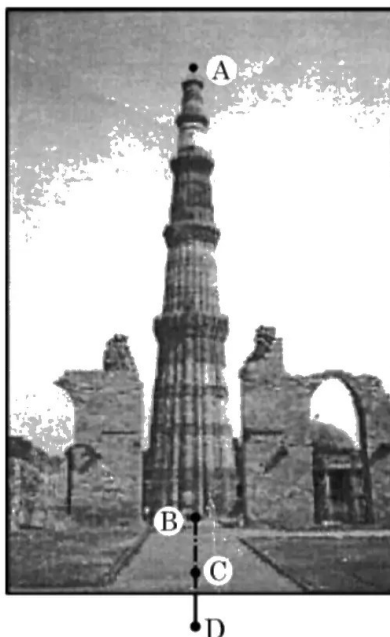
Based on the above given information, answer the following questions:

- i. Find the length of the ladder. **(1)**
- ii. Find the distance of the building Y from point 'O', i.e. OA. **(1)**
- iii. a. Find the horizontal distance between the two buildings. **(2)**

OR

- b. Find the height of the building X. **(2)**

- 110.** Qutub Minar, located in South Delhi, India, was built in the year 1193. It is 72 m high tower. Working on a school project, Charu and Daljeet visited the monument. They used trigonometry to find their distance from the tower. Observe the picture given below. Points C and D represent their positions on the ground in line with the base of tower, the angles of elevation of top of the tower (Point A) are 60° and 45° from points C and D respectively. **[4]**



- i. Based on above information, draw a well-labelled diagram. **(1)**
- ii. Find the distances CD, BC and BD. (use $\sqrt{3} = 1.73$). **(3)**

- 111.** In a village, group of people complained about an electric fault in their area. On their complaint, an electrician reached village to repair an electric fault on a pole of height 10 m. She needs to **[4]**

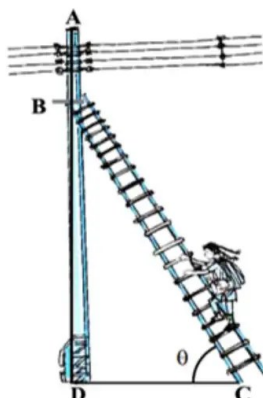
reach a point 1.5 m below the top of the pole to undertake the repair work (see the adjoining figure). She used ladder, inclined at an angle of θ to the horizontal such that $\cos \theta = \frac{\sqrt{3}}{2}$, to reach

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the required position.

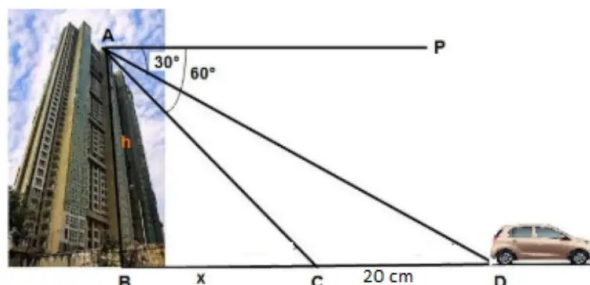


- Find the length BD? (1)
- Find the length of ladder. (1)
- How far from the foot of the pole should she place the foot of the ladder? (2)

OR

If the height of pole and distance BD is doubled, then what will be the length of the ladder? (2)

- 112.** 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° . **[4]**



- Find the value of x. (1)
- Find the height of the building AB. (1)
- Find the distance between top of the building and a car at position D? (2)

OR

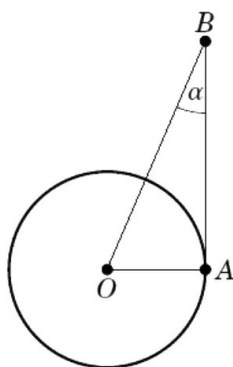
Find the distance between top of the building and a car at position C? (2)

- 113.** Let O be the center of the earth. Let A be a point on the equator, and let B represent an object (e.g. a star) in space, as shown in the figure. If the earth is positioned in such a way that the angle $\angle OAB = 90^\circ$, then we say that the angle $\alpha = \angle OBA$ is the equatorial parallax of the object. **[4]**

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The equatorial parallax of the sun has been observed to be approximately $\alpha = 0.00244^\circ$. The radius of the earth is 3958.8 miles. Given: $\sin \alpha = 4.26 \times 10^{-5}$ and $\tan \alpha = 4.25 \times 10^{-5}$

- Estimate the distance from the center of the earth to the sun.
- Can we say in this problem points O and A are approximately the same points? If yes, how?

114. The International Kite Festival takes place every year on 14th January. The main attractions of the festival include national and international Kite Flyers' Parade, kite flying, traditional stalls etc. On this day, few kite flyers, had assembled at a point 'O' on the ground. The position of 3 kites A, B, C was such that A and B were at the same vertical height of 40 m from the ground level. The angles of elevation of A, B and C from O were 60° , 45° and 30° respectively. A vertical tower, SD has been erected at point S and a camera is set at the top of the tower for photography. **[4]**

Based on the information given above, answer the following questions:

- What is the length of the string of the kite at A? **(1)**
- If the length of the string of kite at C is 40 m, then find the height of that kite C from the ground. **(1)**
- a. What is the horizontal distance between the kites at A and B? **(2)**

OR

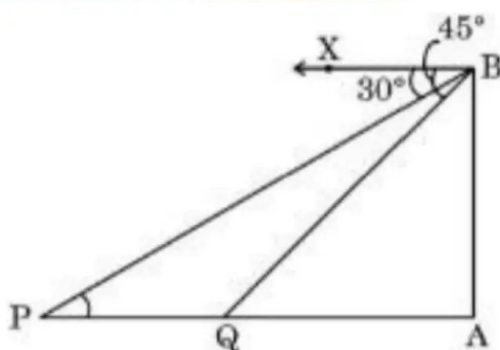
- If the angle of depression of the kite at A is 30° from the camera at D and the distance between A and D is 60 m, then find the height of the tower. **(2)**

115. A lighthouse stands tall on a cliff by the sea, watching over ships that pass by. One day a ship is seen approaching the shore and from the top of the lighthouse, the angles of depression of the ship are observed to be 30° and 45° as it moves from point P to point Q. The height of the lighthouse is 50 metres. **[4]**

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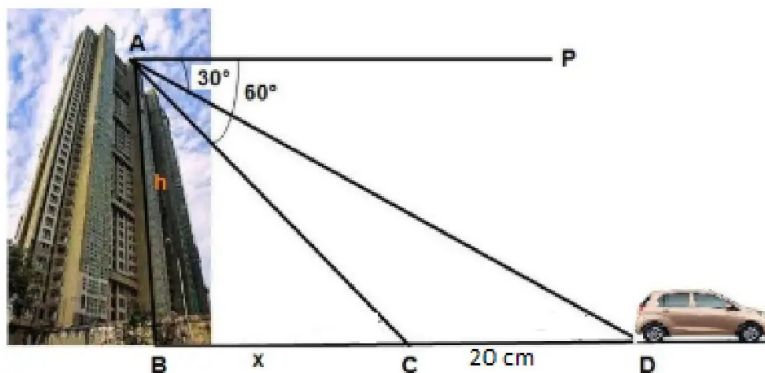
Based on the information given above, answer the following questions:

- Find the distance of the ship from the base of the lighthouse when it is at point Q, where the angle of depression is 45° . **(1)**
- Find the measures of $\angle PBA$ and $\angle QBA$. **(1)**
- a. Find the distance travelled by the ship between points P and Q. **(2)**

OR

- If the ship continues moving towards the shore and takes 10 minutes to travel from Q to A, calculate the speed of the ship in km/h , from Q to A. **(2)**

- 116.** 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° . **[4]**



By analysing the above given situation answer the following questions:

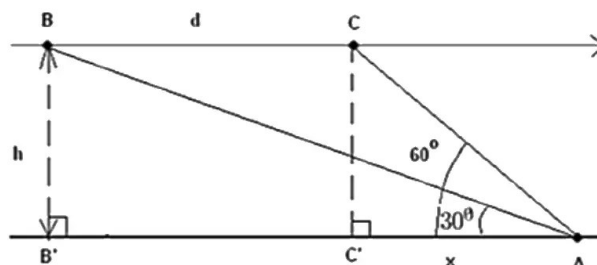
- Find the value of x .
- Find the height of the building AB.

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- 117.** Mr. Vinod is a pilot in Air India. During the Covid-19 pandemic, many Indian passengers were stuck at Dubai Airport. The government of India sent special aircraft to take them. Mr. Vinod was leading this operation. He is flying from Dubai to New Delhi with these passengers. His airplane is approaching point A along a straight line and at a constant altitude h . At 10:00 am, the angle of elevation of the airplane is 30° and at 10:01 am, it is 60° . **[4]**



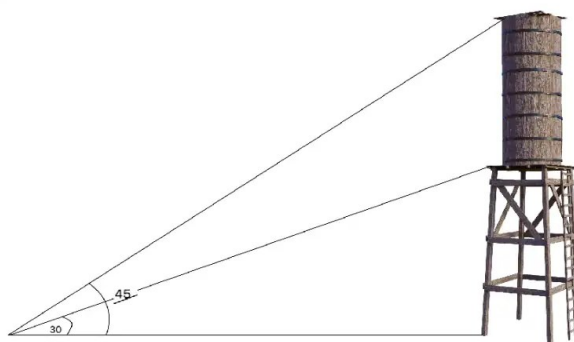
- What is the distance d covered by the airplane from 10:00 am to 10:01 am if the speed of the airplane is constant and equal to 600 miles/hour? (1)
- What is the altitude h of the airplane? (round answer to 2 decimal places) (1)
- Find the distance between passenger and airplane when the angle of elevation is 30° . (2)

OR

Find the distance between passenger and airplane when the angle of elevation is 60° . (2)

- 118.** 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 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. **[4]**

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° . the angle of elevation of the top of a water tank (on the top of the tower) is 45° .



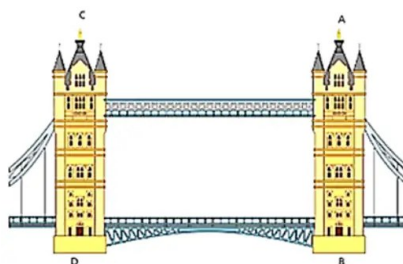
- Find the height of the tower.
- Find the depth of the tank.

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- 119.** Tower Bridge is a Grade I listed combined bascule and suspension bridge in London, built between 1886 and 1894, designed by Horace Jones and engineered by John Wolfe Barry. The bridge is 800 feet (240 m) in length and consists of two bridge towers connected at the upper level by two horizontal walkways, and a central pair of bascules that can open to allow shipping. In this bridge, two towers of equal heights are standing opposite each other on either side of the road, which is 80 m wide. During summer holidays, Neeta visited the tower bridge. She stood at some point on the road between these towers. From that point between the towers on the road, the angles of elevation of the top of the towers was 60° and 30° respectively. **[4]**

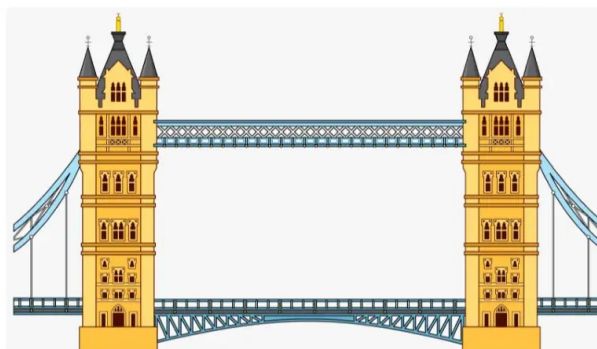


- Find the distances of the point from the base of the towers where Neeta was standing while measuring the height. (1)
- Neeta used some applications of trigonometry she learned in her class to find the height of the towers without actually measuring them. What would be the height of the towers she would have calculated? (1)
- Find the distance between Neeta and top of tower AB? (2)

OR

Find the distance between Neeta and top tower CD? (2)

- 120.** Tower Bridge is a Grade I listed combined bascule and suspension bridge in London, built between 1886 and 1894, designed by Horace Jones and engineered by John Wolfe Barry. The bridge is 800 feet (240 m) in length and consists of two bridge towers connected at the upper level by two horizontal walkways, and a central pair of bascules that can open to allow shipping. In this bridge, two towers of equal heights are standing opposite each other on either side of the road, which is 80 m wide. During summer holidays, Neeta visited the tower bridge. She stood at some point on the road between these towers. From that point between the towers on the road, the angles of elevation of the top of the towers was 60° and 30° respectively. **[4]**



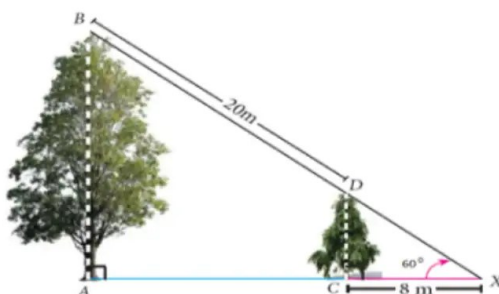
- Neeta used some applications of trigonometry she learned in her class to find the height of the towers without actually measuring them. What would be the height of the towers she would have calculated?
- Also find the distances of the point from the base of the towers where Neeta was standing while measuring the height.

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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- 121.** Two trees are standing on flat ground. The angle of elevation of the top of Both the trees from a point X on the ground is 60° . If the horizontal distance between X and the smaller tree is 8 m and the distance of the top of the two trees is 20 m. **[4]**

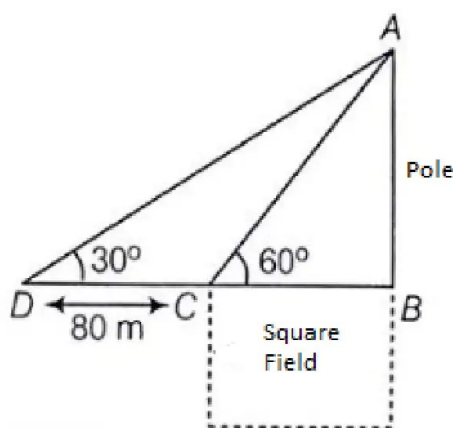


- Calculate the distance between the point X and the top of the smaller tree. (1)
- Calculate the horizontal distance between the two trees. (1)
- Find the height of big tree. (2)

OR

Find the height of small tree. (2)

- 122.** Basant Kumar is a farmer in a remote village of Rajasthan. He has a small square farm land. He wants to do fencing of the land so that stray animals may not enter his farmland. For this, he wants to get the perimeter of the land. There is a pole at one corner of this field. He wants to hang an effigy on the top of it to keep birds away. He standing in one corner of his square field and observes that the angle subtended by the pole in the corner just diagonally opposite to this corner is 60° . When he retires 80 m from the corner, along the same straight line, he finds the angle to be 30° . **[4]**



- Find the length of his square field so that he can buy material to do the fencing work accordingly.
- Find the height of the pole too so that he can arrange a ladder accordingly to put an effigy on the pole.

- 123.** An observer on the top of a 40m tall light house (including height of the observer) observes a ship at an angle of depression 30° coming towards the base of the light house along straight line joining the ship and the base of the light house. The angle of depression of ship changes to 45° after 6 seconds. **[4]**

UNIQUE STUDY POINT

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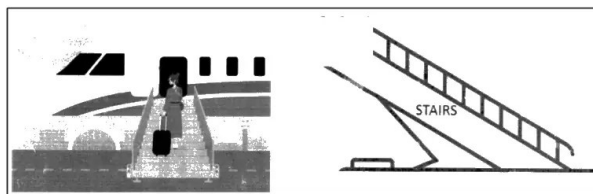


- Find the distance of ship from the base of the light house after 6 seconds from the initial position when angle of depression is 45° . (1)
- Find the distance between two positions of ship after 6 seconds? (1)
- Find the speed of the ship? (2)

OR

Find the distance of ship from the base of the light house when angle of depression is 30° . (2)

- 124.** Passenger boarding stairs, sometimes referred to as boarding ramps, stair cars or aircraft steps, provide a mobile means to travel between the aircraft doors and the ground. Larger aircraft have door sills 5 to 20 feet (1 foot = 30 cm) high. Stairs facilitate safe boarding and de-boarding. **[4]**



An aircraft has a door sill at a height of 15 feet above the ground. A stair car is placed at a horizontal distance of 15 feet from the plane.

Based on given information, answer the questions given in part (i) and (ii).

- Find the angle at which stairs are inclined to reach the door sill 15 feet high above the ground. **(1)**
 - Find the length of stairs used to reach the door sill. **(1)**
- Further, answer any **one** of the following questions:
- a. If the 20 feet long stairs is inclined at an angle of 60° to reach the door sill, then find the

height of the door sill above the ground. (use $\sqrt{3} = 1.732$) **(2)**

OR

- b. What should be the shortest possible length of stairs to reach the door sill of the plane 20 feet above the ground, if the angle of elevation cannot exceed 30° ? Also, find the horizontal distance of base of stair car from the plane. **(2)**

- 125.** An injured bird was found on the roof of a building. The building is 15 m high. A fireman **[4]**
was called to rescue the bird. The fireman used an adjustable ladder to reach the roof. He placed the ladder in such a way that the ladder makes an angle of 60° with the ground in order to reach the roof.

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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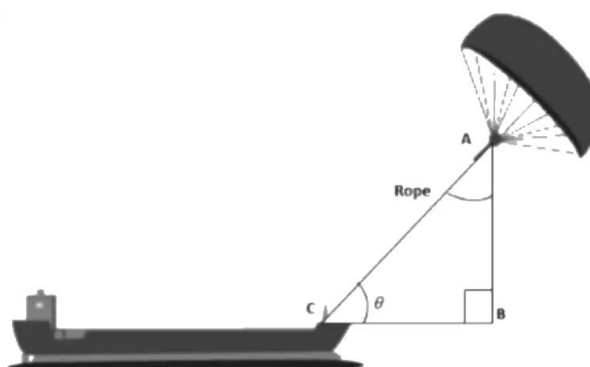
Based on the above information, answer the following questions:

- Find the length of the ladder used by the fireman to reach the roof. **(1)**
- Find the distance of the point on the ground at which the ladder was fixed from the bottom of the building. **(1)**
- In order to avoid skidding, the fireman placed the ladder in such a way that the bottom of the ladder touches the base of the wall which is opposite to the building, making an angle of 30° with the ground.
 - Draw a neat diagram to represent the above situation and hence find the width of the road between the building and the wall. **(2)**

OR

- Find the length of the ladder used by the fireman in this case. **(2)**

- 126.** Skysails is the genre of engineering science that uses extensive utilization of wind energy to move a vessel in the seawater. The 'Skysails' technology allows the towing kite to gain a height of anything between 100 metres - 300 metres. The sailing kite is made in such a way that it can be raised to its proper elevation and then brought back with the help of a 'telescopic mast' that enables the kite to be raised properly and effectively. **[4]**



- In the given figure, if $\sin \theta = \cos(\theta - 30^\circ)$, where θ and $\theta - 30^\circ$ are acute angles, then find the value of θ . **(1)**
- What should be the length of the rope of the kite sail in order to pull the ship at the angle θ (calculated above) and be at a vertical height of 200m? **(1)**
- In the given figure, if $\sin \theta = \cos(3\theta - 30^\circ)$, where θ and $3\theta - 30^\circ$ are acute angles, then find the value of θ . **(2)**

OR

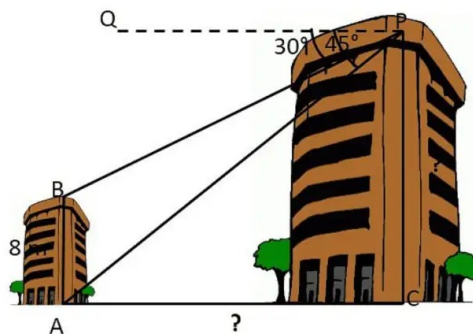
What should be the length of the rope of the kite sail in order to pull the ship at the angle θ (calculated above) and be at a vertical height of 150m? **(2)**

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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- 127.** Basant and Vinod lives in a housing society in Dwarka, New Delhi. There are two building in their housing society. The first building is 8 meter tall. One day, both of them were just trying to guess the height of the other multi-storeyed building. Vinod said that it might be a 45° angle from the bottom of our building to the top of multi-storeyed building so the height of the building and distance from our building to this multi-storeyed building will be same. Then, both of them decided to estimate it using some trigonometric tools. Let's assume that the first angles of depression of the top and bottom of an 8 m tall building from top of a multi-storeyed building are 30° and 45° , respectively. **[4]**



- i. Now help Vinod and Basant to find the height of the multi-storeyed building.
 - ii. Also, find the distance between two buildings.
- 128.** Gadisar Lake is located in the Jaisalmer district of Rajasthan. It was built by the King of Jaisalmer and rebuilt by Gadsingh in 14th century. The lake has many Chhatris. One of them is shown below: **[4]**
- Observe the picture. From a point A h m above from water level, the angle of elevation of top of Chhatri (point B) is 45° and angle of depression of its reflection in water (point C) is 60° . If the height of Chhatri above water level is (approximately) 10 m, then
- i. draw a well-labelled figure based on the above information; (2)
 - ii. find the height (h) of the point A above water level. (Use $\sqrt{3} = 1.73$). (2)
- 129.** The following TV Tower was built in 1988 and is located in Pitampura, Delhi. It has an observation deck. Observe the picture given below: **[4]**



The TV Tower stands vertically on the ground. From a point A on the ground, the angle of elevation of top of the tower (point B) is 60° . There is a point C on the tower which is 78 m (approx.) above the ground. The angle of elevation of the point C from point A is found to be 30° .

UNIQUE STUDY POINT

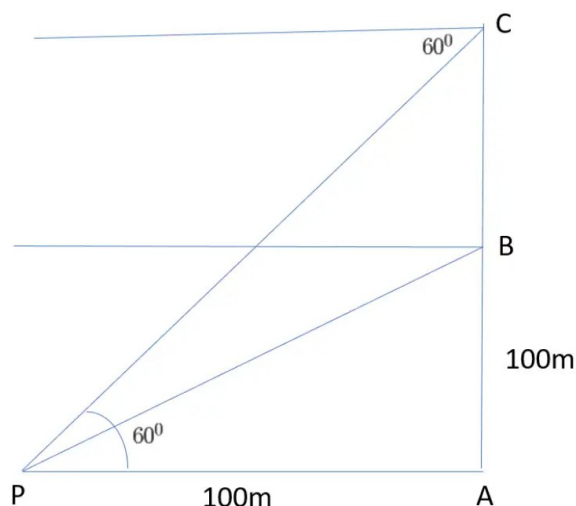
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Based on the above information, answer the following questions:

- Draw a well-labelled figure, based on the information given above. (2)
- Find the height of the tower and the distance of the tower from point A. (2)

- 130.** A hot air balloon is rising vertically from a point A on the ground which is at distance of 100m from a car parked at a point P on the ground. Amar, who is riding the balloon, observes that it took him 15 seconds to reach a point B which he estimated to be equal to the horizontal distance of his starting point from the car parked at P. **[4]**



- Find the angle of depression from the balloon at a point B to the car at point P. (1)
- Find the speed of the balloon? (1)
- After certain time Amar observes that the angle of depression is 60° . Find the vertical distance travelled by the balloon during this time. (2)

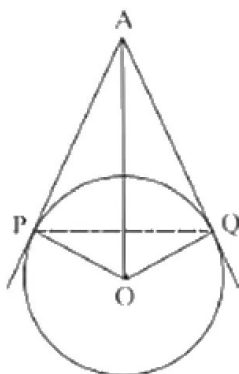
OR

Find the total time taken by the balloon to reach the point C from ground? (2)

SECTION - I : CIRCLES

This section consists of 7 case based questions of 4 marks each.

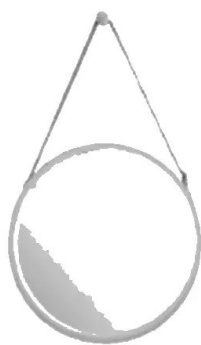
- 131.** The picture given below shows a circular mirror hanging on the wall with a cord. The diagram represents the mirror as a circle with centre O. AP and AQ are tangents to the circle at P and Q respectively such that $AP = 30$ cm and $\angle PAQ = 60^\circ$. **[4]**



UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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Based on the above information, answer the following questions:

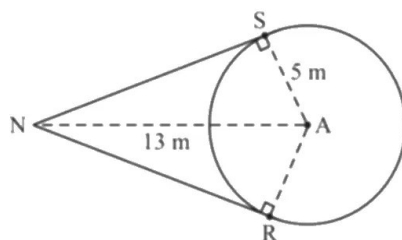
- Find the length PQ.
- Find $m\angle POQ$.
- a. Find the length OA.

OR

- b. Find the radius of the mirror.

132. In an international school in Hyderabad organised an Interschool Throwball Tournament for girls just after the pre-board exam. The throwball team was very excited. The team captain Anju directed the team to assemble in the ground for practices. Only three girls Aarushi, Sarika and Avni showed up. The rest did not come on the pretext of preparing for pre-board exam. Anju drew a circle of radius 5 m on the ground. The centre A was the position of Aarushi. Anju marked a point N, 13 m away from centre A as her own position. From the point N, she drew two tangential lines NS and NR and gave positions S and R to Sarika and Avni. Anju throws the ball to Aarushi, Aarushi throws it to Sarika, Sarika throws it to Anju, Anju throws it to Avni, Avni throws it to Aarushi, Aarushi throws it to Sarika and so on.

[4]



- Find the measure of $\angle NSA$. (1)
- Find the distance between Sarika and Anju. (1)
- If $\angle SNR$ is equal to θ , then find $\angle NAS$. (2)

OR

Find $\angle SNR + \angle SAR$. (2)

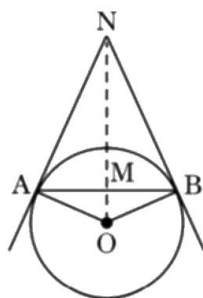
133. Circles play an important part in our life. When a circular object is hung on the wall with a cord at nail N, the cords NA and NB work like tangents. Observe the figure, given that $\angle ANO = 30^\circ$ and $OA = 5$ cm.

[4]

UNIQUE STUDY POINT

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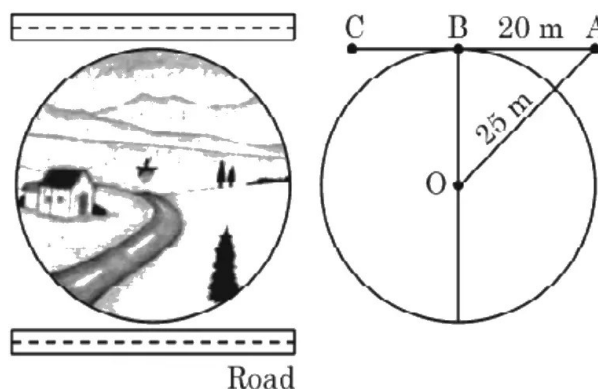


- i. Find the distance AN. (1)
- ii. Find the measure of $\angle AOB$. (1)
- iii. Find the total length of cords NA, NB and the chord AB. (2)

OR

If $\angle ANO$ is 45° , then name the type of quadrilateral OANB. Justify your answer. (2)

- 134.** People of a circular village Dharamkot want to construct a road nearest to it. The road cannot pass through the village. But the people want the road at a shortest distance from the centre of the village. Suppose the road starts from A which is outside the circular village (as shown in the figure) and touch the boundary of the circular village at B such that $AB = 20$ m. Also the distance of the point A from the centre O of the village is 25 m. **[4]**

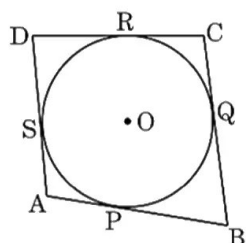


- i. If B is the mid-point of AC, then find the distance AC. (1)
- ii. Find the shortest distance of the road from the centre of the village. (1)
- iii. Find the circumference of the village. (2)

OR

Find the area of the village. (2)

- 135.** In a park, four poles are standing at positions A, B, C and D around the circular fountain such that the cloth joining the poles AB, BC, CD and DA touches the circular fountain at P, Q, R and S respectively as shown in the figure. **[4]**



- i. If O is the centre of the circular fountain, then $\angle OSA = \dots$ (1)
- ii. If $AB = AD$, then write the name of the figure ABCD. (1)
- iii. If $DR = 7$ cm and $AD = 11$ cm, then find the length of AP. (2)

UNIQUE STUDY POINT

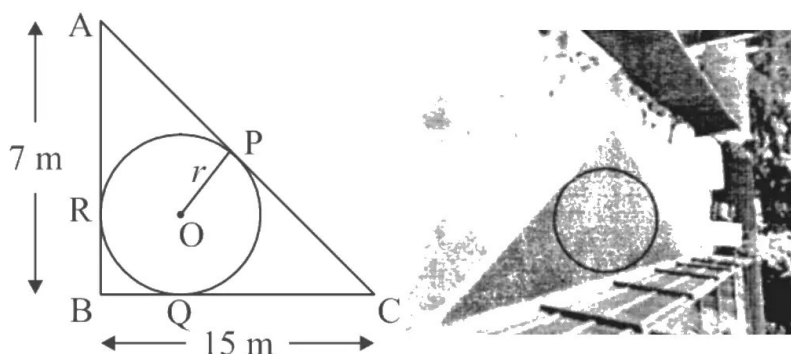
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OR

If O is the centre of the circular fountain with $\angle QCR = 60^\circ$, then find the measure of $\angle QOR$. (2)

- 136.** A backyard is in the shape of a triangle ABC with right angle at B. $AB = 7\text{m}$ and $BC = 15\text{m}$. A circular pit was dug inside it such that it touches the walls AC, BC and AB at P, Q and R respectively such that $AP = x\text{m}$. **[4]**



Based on the above information, answer the following questions:

- i. Find the length of AR in terms of x. (1)
- ii. Write the type of quadrilateral BQOR. (1)
- iii. a. Find the length PC in terms of x and hence find the value of x. (2)

OR

- b. Find x and hence find the radius r of circle. (2)

- 137.** In a park, four poles are standing at positions A, B, C and D around the fountain such that the wire joining the poles AB, BC, CD and DA touches the fountain at P, Q, R and S respectively as shown in the figure. **[4]**



- i. If O is the center of the circular fountain, then find $\angle OSA$. (1)
- ii. If $DR = 7\text{cm}$ and $AD = 11\text{cm}$, then find AP. (1)
- iii. If O is the center of the fountain, with $\angle QCR = 60^\circ$, then $\angle QOR$. (2)

OR

Prove that $AD + BC = AB + CD$. (2)

SECTION - J : AREAS RELATED TO CIRCLES

This section consists of 13 case based questions of 4 marks each.

- 138.** A brooch is a decorative piece often worn on clothing like jackets, blouses or dresses to add elegance. Made from precious metals and decorated with gemstones, brooches come in many shapes and designs. **[4]**

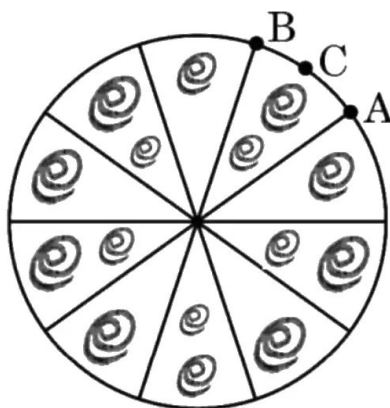
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One such brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in the figure.



Based on the above given information, answer the following questions:

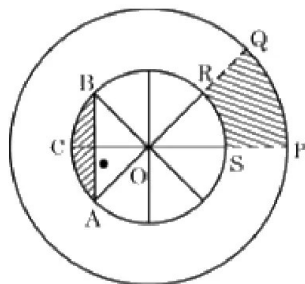
- Find the central angle of each sector. **(1)**
- Find the length of the arc ACB. **(1)**
- a. Find the area of each sector of the brooch. **(2)**

OR

- Find the total length of the silver wire used. **(2)**

139. NSS (National Service Scheme) aims to connect the students to the community and to involve them in problem solving process. NSS symbol is based on the **Rath** wheel of the Konark Sun Temple situated in Odisha. The wheel signifies the progress cycle of life. The diagrammatic representation of the symbol is given below:

[4]



Observe the figure given above. The diameters of inner circle are equally placed. Given that $OP = 21$ cm, $OS = 10$ cm.

Based on the above information, answer the following questions:

- Find $m\angle ROS$.

UNIQUE STUDY POINT

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- ii. Find the perimeter of sector OPQ.
- iii. a. Find the area of shaded region PQRS.

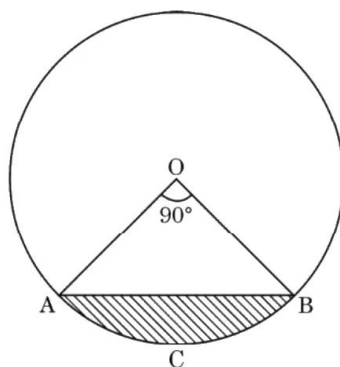
OR

- b. Find the area of shaded region ACB i.e. the segment ACB.

140. Age of a tree: The most accurate way to determine the age of a tree is to count the annual rings of wood growth. One such trunk has been shown here. **[4]**



To make an identification mark, the forest department has painted segment ACBA. (See diagram) If chord AB makes an angle 90° at the centre and radius of the trunk is 21 cm, then find the:



- i. length of chord AB. (1)
- ii. area of $\triangle OAB$. (1)
- iii. area of segment ACBA. (2)

OR

- perimeter of sector OACBO. (2)

141. While dusting a maid found a button whose upper face is of red color, as shown in the figure. **[4]**
The diameter of each of the smaller identical circles is $\frac{1}{4}$ of the diameter of the larger circle whose radius is 16 cm.



- i. Find the area of each of the smaller circle. (1)
- ii. Find the area of the larger circle. (1)
- iii. Find the area of quadrant of a smaller circle. (2)

OR

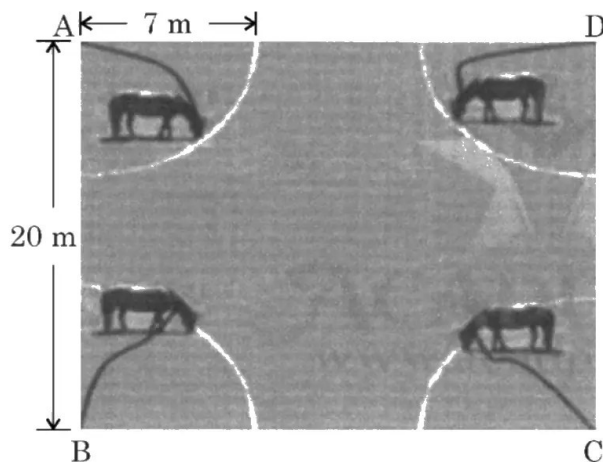
- Find the area of the black colour region. (2)

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

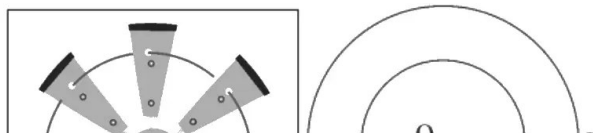
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- 142.** A stable owner has four horses. He usually tie these horses with 7 m long rope to pegs at each corner of a square shaped grass field of 20 m length, to graze in his farm. But tying with rope sometimes results in injuries to his horses, so he decided to build fence around the area so that each horse can graze. **[4]**

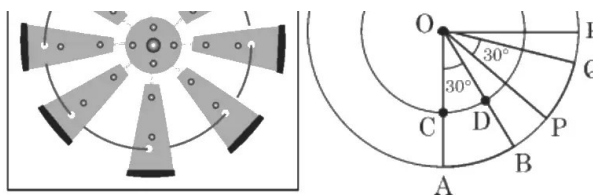


Based on the above, answer the following questions:

- i. Find the area of the square shaped grass field. **(1)**
 - ii. a. Find the area of the total field in which these horses can graze. **(2)**
- OR**
- b. If the length of the rope of each horse is increased from 7 m to 10 m, find the area grazed by one horse. (Use $\pi = 3.14$) **(2)**
 - iii. What is area of the field that is left ungrazed, if the length of the rope of each horse is 7 cm? **(1)**



- 143.** A farmer has put up a decorative windmill in his farm in which there are eight blades of equal width and equally placed in a circular arrangement. A circular wire goes through them. **[4]**



The diagram shows two blades OAB and OPQ in a quarter circle with centre O. $\angle AOB = \angle POQ = 30^\circ$, $OA = 28 \text{ cm}$, $OC = 21 \text{ cm}$.

O is the centre of both the circles.

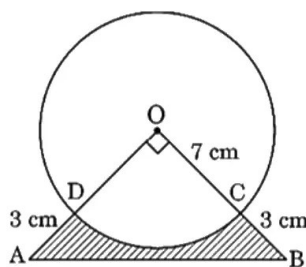
- i. Determine the measure of $\angle BOP$. **(1)**
 - ii. Find length of arc CD. **(1)**
 - iii. a. Find the area of region CABD. **(2)**
- OR**
- b. Find perimeter of region CABD. **(2)**

- 144.** In an annual day function of a school, the organizers wanted to give a cash prize along with a memento to their best students. Each memento is made as shown in the figure and its base ABCD is shown from the front side. The rate of silver plating is ₹ 20 per cm^2 . **[4]**

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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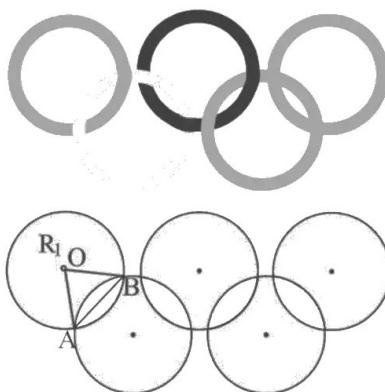


- i. What is the area of the quadrant ODCO? (1)
- ii. Find the area of $\triangle AOB$. (1)
- iii. What is the total cost of silver plating the shaded part ABCD? (2)

OR

What is the length of arc CD? (2)

- 145.** The Olympic symbol comprising five interlocking rings represents the union of the five continents of the world and the meeting of athletes from all over the world at the Olympic games. In order to spread awareness about Olympic games, students of Class-X took part in various activities organised by the school. One such group of students made 5 circular rings in the school lawn with the help of ropes. Each circular ring required 44 m of rope. Also, in the shaded regions as shown in the figure, students made rangoli showcasing various sports and games. It is given that $\triangle OAB$ is an equilateral triangle and all unshaded regions are congruent. **[4]**



Based on above information, answer the following questions:

- i. Find the radius of each circular ring. **(1)**
- ii. What is the measure of $\angle AOB$? **(1)**
- iii. a. Find the area of shaded region R1. **(2)**

OR

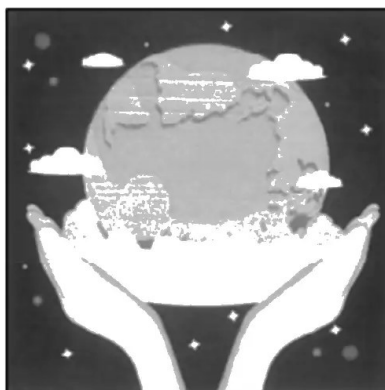
- b. Find the length of rope around the unshaded regions. **(2)**

- 146.** For the inauguration of 'Earth day' week in a school, badges were given to volunteers. Organisers purchased these badges from an NGO, who made these badges in the form of a circle inscribed in a square of side 8 cm. **[4]**

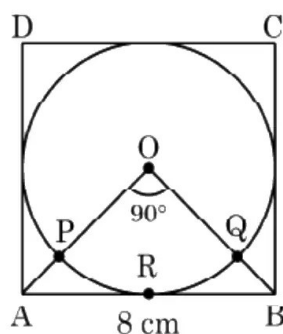
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O is the centre of the circle and $\angle AOB = 90^\circ$:

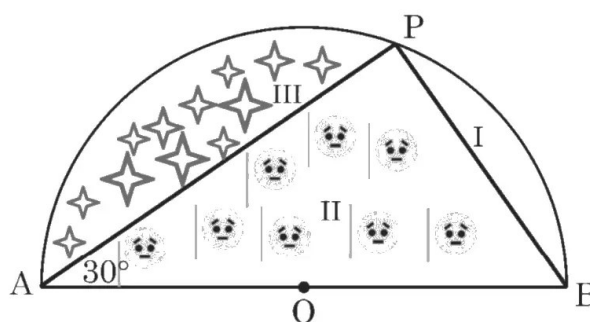


- i. What is the area of square ABCD? (1)
- ii. What is the length of diagonal AC of square ABCD? (1)
- iii. Find the area of sector OPRQO. (2)

OR

Find the area of remaining part of square ABCD when area of circle is excluded. (2)

- 147.** Anurag purchased a farmhouse which is in the form of a semicircle of diameter 70 m. He divides it into three parts by taking a point P on the semicircle in such a way that $\angle PAB = 30^\circ$ as shown in the following figure, where O is the centre of semicircle. **[4]**



In part I, he planted saplings of Mango tree, in part II, he grew tomatoes and in part III, he grew oranges. Based on given information, answer the following questions.

- i. What is the measure of $\angle POA$? (1)
- ii. Find the length of wire needed to fence entire piece of land. (1)
- iii. a. Find the area of region in which saplings of Mango tree are planted. (2)

OR

- b. Find the length of wire needed to fence the region III. (2)

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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- 148.** Pawan had a farm with many animals like cows, dogs, horses etc. He had sufficient grassland for the cows and horses to graze, One day Three of his horses were tied with 7 metre long ropes at the three corners of a triangular lawn having sides 20 m, 34 m and 42 m. [4]

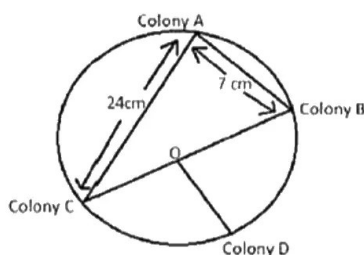


- Find the area of the triangular lawn. (1)
- Find the area of the field that can be grazed by the horses. (1)
- Find the area that cannot be grazed by the horses. (2)

OR

If $\angle A = 60^\circ$, find the area grazed by horses tied at corner B and C. (2)

- 149.** To find the polluted region in different areas of Dwarka (a part of Delhi represented by the circle given below) a survey was conducted by the students of class X. It was found that the shaded region is the polluted region, where O is the centre of the circle. [4]



- Find the radius of the circle. (1)
- Find the area of the circle. (1)
- If D lies at the middle of arc BC, then what is the area of region COD? (2)

OR

Find the area of the polluted region. (2)

- 150.** Flower beds look beautiful growing in gardens. One such circular park of radius 'r' m, has two segments with flowers. One segment which subtends an angle of 90° at the centre is full of red roses, while the other segment with central angle 60° is full of yellow coloured flowers. [See figure] [4]

It is given that the combined area of the two segments (of flowers) is $256\frac{2}{3}$ sq m.

- Write an equation representing the total area of the two segments in terms of **r**. (1)
- Find the value of **r**. (1)
- Find the area of the segment with red roses. (2)

OR

Find the area of the segment with yellow flowers. (2)

UNIQUE STUDY POINT

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iv.

SECTION - K : SURFACE AREAS, VOLUMES AND AREAS OF CIRCLES

This section consists of 19 case based questions of 4 marks each.

- 151.** The word **circus** has the same root as **circle**. In a closed circular area, various entertainment acts including human skill and animal training are presented before the crowd. **[4]**

A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of tent is 18.5 m.



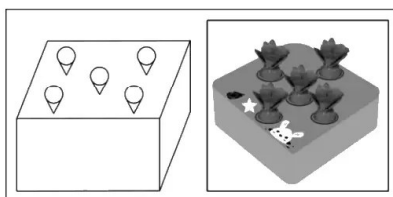
Based on the above, answer the following questions:

- Find slant height of the conical part. **(1)**
- Determine the floor area of the tent. **(1)**
- a. Find area of the cloth used for making tent. **(2)**

OR

- Find total volume of air inside an empty tent. **(2)**

- 152.** A solid cuboidal toy is made of wood. It has five cone shaped cavities to hold toy carrots. **[4]**
The dimensions of the toy are cuboid - 10 cm $\times$ 10 cm $\times$ 8 cm.
Each cone carved out - Radius = 2.1 cm and Height = 6 cm.



- Find the volume of wood carved out to make five conical cavities. (2)
- Find the volume of the wood in the final product. (2)

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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- 153.** A wooden toy is shown in the picture. This is a cuboidal wooden block of dimensions $14\text{ cm} \times 17\text{ cm} \times 4\text{ cm}$. On its top there are seven cylindrical hollows for bees to fit in. Each cylindrical hollow is of height 3 cm and radius 2 cm . **[4]**

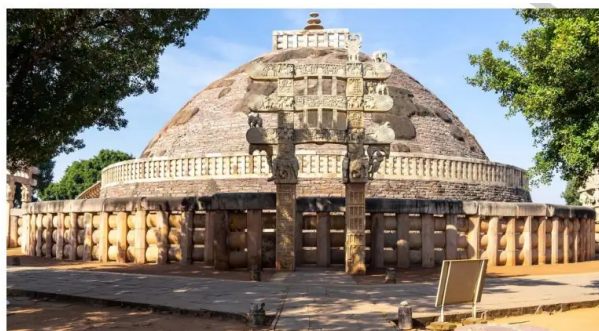


- Find the volume of wood carved out to make one cylindrical hollow. (1)
- Find the lateral surface area of the cuboid to paint it with green colour. (1)
- Find the volume of wood in the remaining cuboid after carving out seven cylindrical hollows. (2)

OR

Find the surface area of the top surface of the cuboid to be painted yellow. (2)

- 154.** Ashish is a Class IX student. His class teacher Mrs Verma arranged a historical trip to great Stupa of Sanchi. She explained that Stupa of Sanchi is great example of architecture in India. Its base part is cylindrical in shape. The dome of this stupa is hemispherical in shape, known as Anda. It also contains a cubical shape part called Hermika at the top. Path around Anda is known as Pradakshina Path. **[4]**



- Find the volume of the Hermika, if the side of cubical part is 10 m . (1)
- Find the volume of cylindrical base part whose diameter and height 48 m and 14 m . (1)
- If the volume of each brick used is 0.01 m^3 , then find the number of bricks used to make the cylindrical base. (2)

OR

If the diameter of the Anda is 42 m , then find the volume of the Anda. (2)

- 155.** A juice seller is serving his customers using cylindrical container with radius 20 cm and height 50 cm . He serves juice into a glass as shown in Fig. The inner diameter of the cylindrical glass is 5 cm , but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. **[4]**

UNIQUE STUDY POINT

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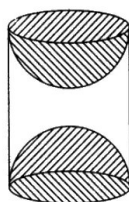


- If the height of a glass was 10 cm, find the apparent capacity of the glass. (1)
- Also, find its actual capacity. (Use $\pi = 3.14$) (1)
- Find the capacity of the container in liter? (2)

OR

How many glasses he serves if the container is full? (2)

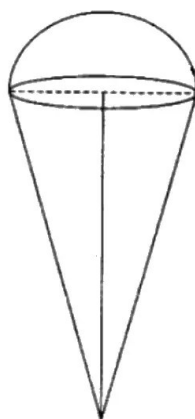
- 156.** A carpenter used to make different kinds and different shapes of a toy of wooden material. One day a man came to his shop to purchase an article that has values as per his requirement. He instructed the carpenter to make the toy by taking a wooden block of rectangular shape with height 12 cm and width 9 cm, then shaping this block as a solid cylinder and then scooping out a hemisphere from each end, as shown in the given figure. The difference between the length of rectangle and height of the cylinder is 2 cm (Rectangle length > Cylinder height), and the difference between the breadth of rectangle and the base of cylinder is also 2 cm (Rectangle breadth > Cylinder base(diameter)). **[4]**



By using the above information, answer the following question:

- Find the volume of the cylindrical block before the carpenter started scooping the hemisphere from it.
- Find the total surface area of the article.

- 157.** An 'ice-cream seller used to sell different kinds and different shapes of ice-cream like rectangular shaped with one end hemispherical, cone-shaped and rectangular brick, etc. One day a child came to his shop and purchased an ice-cream which has the following shape: ice-cream cone as the union of a right circular cone and a hemisphere that has the same (circular) base as the cone. The height of the cone is 9 cm and the radius of its base is 2.5 cm. **[4]**



By reading the above-given information, find the following:

- The volume of the ice-cream without hemispherical end.

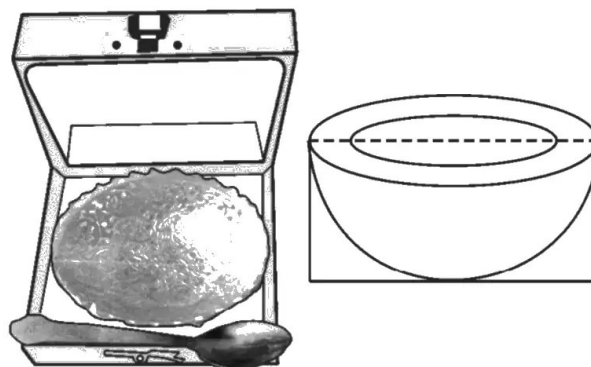
UNIQUE STUDY POINT

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- ii. The volume of the ice-cream with a hemispherical end.

158. A hemispherical bowl is packed in a cuboidal box. The bowl just fits in the box. Inner radius of the bowl is 10 cm. Outer radius of the bowl is 10.5 cm. **[4]**



Based on the above, answer the following questions:

- Find the dimensions of the cuboidal box. **(1)**
- Find the total outer surface area of the box. **(1)**
- a. Find the difference between the capacity of the bowl and the volume of the box. (use $\pi = 3.14$) **(2)**

OR

- The inner surface of the bowl and the thickness is to be painted. Find the area to be painted. **(2)**

159. Rohan makes a project on coronavirus in science for an exhibition in his school. In this Project, he picks a sphere which has volume 38808 cm^3 and 11 cylindrical shapes each of Volume 1540 cm^3 with 10 cm length. **[4]**



- Find the area covered by cylindrical shapes on the surface of a sphere. (1)
- Find the diameter of the sphere. (1)
- Find the total volume of the shape. (2)

OR

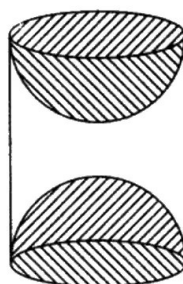
Find the curved surface area of the cylindrical shape. (2)

160. A carpenter used to make different kinds and different shapes of a toy of wooden material. One day a man came to his shop to purchase an article that has values as per his requirement. He instructed the carpenter to make the toy by taking a wooden block of rectangular shape with height 12 cm and width 9 cm, then shaping this block as a solid cylinder and then scooping out a hemisphere from each end, as shown in the given figure. The difference between the length of rectangle and height of the cylinder is 2 cm (Rectangle length > Cylinder height), and the difference between the breadth of rectangle and the base of cylinder is also 2 cm (Rectangle breadth > Cylinder base(diameter)). **[4]**

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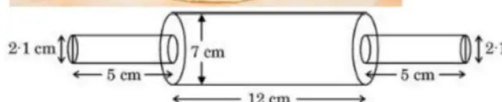


- Find the volume of the cylindrical block before the carpenter started scooping the hemisphere from it. (1)
- Find the volume of wood scooped out? (1)
- Find the total surface area of the article? (2)

OR

Find the total surface area of cylinder before scooping out hemisphere? (2)

- 161.** A skilled carpenter decided to craft a special rolling pin for the local baker. He carefully joined three cylindrical pieces of wood - two small ones on the ends and one larger in the centre to create a perfect tool. The baker loved the rolling pin, as it rolled out the smoothest dough for breads and pastries. **[4]**



The length of the bigger cylindrical part is 12 cm and diameter is 7 cm and the length of each smaller cylindrical part is 5 cm and diameter is 2.1 cm.

Based on the above information, answer the following questions:

- Find the volume of the bigger cylindrical part. **(1)**
- Find the curved surface area of the bigger cylindrical part. **(1)**
- a. Find the ratio of the volume of the bigger cylindrical part to the total volume of the two smaller (identical) cylindrical parts. **(2)**

OR

- Find the sum of the curved surface areas of the two identical smaller cylindrical parts. **(2)**

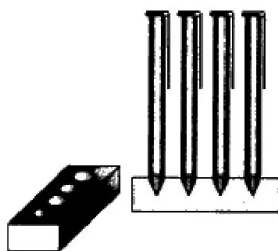
- 162.** A carpenter in the small town of Bareilly used to make and sell different kinds of wood items like a rectangular box, cylindrical pen stand, and cuboidal pen stand. One day a student came to his shop and asked him to make a pen stand with the dimensions as follows: **[4]**

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A pen stand should be in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid should be 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm.



- The volume of the cuboidal part. (1)
- The volume of wood in the entire stand. (1)
- Total volume of conical depression. (2)

OR

If the cost of wood used is ₹10 per cm^3 , then the total cost of making the pen stand. (2)

- 163.** An ice-cream seller used to sell different kinds and different shapes of ice-cream like rectangular shaped with one end hemispherical, cone-shaped and rectangular brick, etc. One day Sheetal and her brother came to his shop. Sheetal purchased an ice-cream which has the following shape: ice-cream cone as the union of a right circular cone and a hemisphere that has the same (circular) base as the cone. The height of the cone is 9 cm and the radius of its base is 2.5 cm. her brother purchased rectangular brick shaped ice cream with length 9 cm, width 4cm and thickness 2 cm. **[4]**



- The volume of the ice-cream without a hemispherical end. (1)
- The volume of the ice-cream with a hemispherical end. (1)
- Find the volume her brother ice cream? (2)

OR

Whose quantity of ice cream is more and by how much? (2)

- 164.** Mayank a student of class 7th loves watching and playing with birds of different kinds. One day he had an idea in his mind to make a bird-bath on his garden. His brother who is studying in class 10th helped him to choose the material and shape of the birdbath. They made it in the shape of a cylinder with a hemispherical depression at one end as shown in the Figure below. They opted for the height of the hollow cylinder as 1.45 m and its radius is 30 cm. **[4]**

By using the above-given information, find the following:

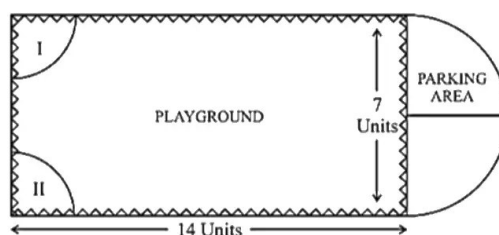
- The curved surface area of the hemisphere.
- The total surface area of the bird-bath. (Take $\pi = 22/7$)

- 165.** Governing council of a local public development authority of Dehradun decided to build an adventurous playground on the top of a hill, which will have adequate space for parking. **[4]**

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After survey, it was decided to build rectangular playground, with a semi-circular area allotted for parking at one end of the playground. The length and breadth of the rectangular playground are 14 units and 7 units, respectively. There are two quadrants of radius 2 units on one side for special seats.

- What is the total perimeter of the parking area? (1)
- What is the total area of parking and the two quadrants? (2)

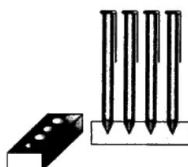
OR

What is the ratio of area of playground to the area of parking area? (2)

- Find the cost of fencing the playground and parking area at the rate of ₹ 2 per unit. (1)

- 166.** A carpenter in the small town of Bareilly used to make and sell different kinds of wood items like a rectangular box, cylindrical pen stand, and cuboidal pen stand. One day a student came to his shop and asked him to make a pen stand with the dimensions as follows: **[4]**

A pen stand should be in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid should be 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm.



By using the above-given information, find the following:

- The volume of the cuboid.
- The volume of wood in the entire stand.

- 167.** A juice seller was serving his customers using glasses as shown in Figure. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity. (Use $\pi = 3.14$) **[4]**

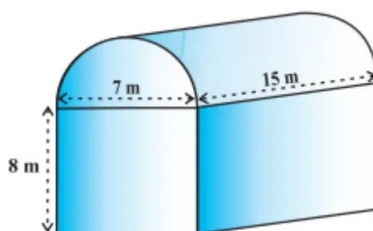


- 168.** Shanta runs an industry in a shed which was in the shape of a cuboid surmounted by half cylinder. The dimensions of the base were 15 m $\times$ 7 m $\times$ 8 m. **[4]**
The diameter of the half cylinder was 7 m and length was 15 m.

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- Find the volume of the air that the shed can hold. (1)
- If the industry requires machinery which would occupy a total space of 300 m^3 and there are 20 workers each of whom would occupy 0.08 m^3 space on an average, how much air would be in the shed when it is working? (1)
- Find the surface area of the cuboidal part. (2)

OR

Find the surface area of the cylindrical part. (2)

- 169.** Singing bowls (hemispherical in shape) are commonly used in sound healing practices. [4]
Mallet (cylindrical in shape) is used to strike the bowl in a sequence to produce sound and vibration.



One such bowl is shown here whose dimensions are:

Hemispherical bowl has outer radius 6 cm and inner radius 5 cm.

Mallet has height of 10 cm and radius 2 cm.

- What is the volume of the material used in making the mallet? (1)
- The bowl is to be polished from inside. Find the inner surface area of the bowl. (1)
- Find the volume of metal used to make the bowl. (2)

OR

Find total surface area of the mallet. (Use $\pi = 3.14$) (2)

SECTION - L : STATISTICS

This section consists of 9 case based questions of 4 marks each.

- 170.** Under the physical and health education a medical check up program was conducted in a Vidyalaya to improve the health and fitness conditions of the students. Reading of the heights of 50 students was obtained as given in the table below: [4]

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Height (in cm)	Number of students
135-140	2
140-145	8
145-150	10
150-155	15
155-160	6
160-165	5
165-170	4

- Find the lower class limit of the modal class. (1)
- Find the median class. (1)
- Find the assumed mean of the data. (2)

OR

Find the median of the given data. (2)

171. BINGO is game of chance. The host has 75 balls numbered 1 through 75. Each player has a BINGO card with some numbers written on it. **[4]**

The participant cancels the number on the card when called out a number written on the ball selected at random. Whosoever cancels all the numbers on his/her card, says BINGO and wins the game.



The table given below, shows the data of one such game where 48 balls were used before Tara said **BINGO**.

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Numbers announced	Number of times
0 - 15	8
15 - 30	9
30 - 45	10
45 - 60	12
60 - 75	9

Based on the above information, answer the following:

- i. Write the median class. **(1)**
- ii. When first ball was picked up, what was the probability of calling out an even number? **(1)**
- iii. a. Find median of the given data. **(2)**

OR

- b. Find mode of the given data. **(2)**

172. Vocational training complements traditional education by providing practical skills and hands-on experience. While education equips individuals with a broad knowledge base, vocational training focuses on job-specific skills, enhancing employability thus making the student self-reliant. **[4]**

Keeping this in view, a teacher made the following table giving the frequency distribution of students/adults undergoing vocational training from the training institute.



Age (in years)	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54
Number of participants	62	132	96	37	13	11	10	4

From the above answer the following questions:

- i. What is the lower limit of the modal class of the above data? **(1)**
- ii. a. Find the median class of the above data. **(2)**

OR

- b. Find the number of participants of age less than 50 years who undergo vocational training. **(2)**
- iii. Give the empirical relationship between mean, median and mode. **(1)**

173. COVID-19 Pandemic The COVID-19 pandemic, also known as coronavirus pandemic, is an ongoing pandemic of coronavirus disease caused by the transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) among humans. **[4]**

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The following tables show the age distribution of cases admitted during a day in two different hospitals Table 1

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65
No. of cases	6	11	21	23	14	5

Table 2

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65
No. of cases	8	16	10	42	24	12

- Refer to table 1** Find the average age for which maximum cases occurred. (1)
- Refer to table 1** Find the upper limit of modal class. (1)
- Refer to table 2** Find the median of the given data. (2)

OR

Find the median of the given data. (2)

- 174.** Gurpreet is very fond of doing research on plants. She collected some leaves from different plants and measured their lengths in mm. **[4]**



The data obtained is represented in the following table:

Length (in mm):	70-80	80-90	90-100	100-110	110-120	120-130	130-140
Number of leaves:	3	5	9	12	5	4	2

Based on the above information, answer the following questions:

- Write the median class of the data.
- How many leaves are of length equal to or more than 10 cm?
- a. Find median of the data.

OR

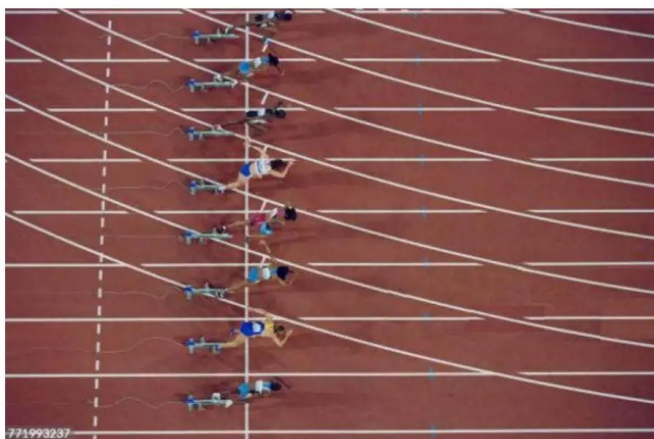
- Write the modal class and find the mode of the data.

- 175.** Activities like running or cycling reduce stress and the risk of mental disorders like depression. Running helps build endurance. Children develop stronger bones and muscles and are less prone to gain weight. The physical education teacher of a school has decided to conduct an inter school running tournament in his school premises. The time taken by a group of students to run 100 m, was noted as follows: **[4]**

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Time (in seconds)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Number of students	8	10	13	6	3

Based on the above, answer the following questions:

- What is the median class of the above given data? **(1)**
- a. Find the mean time taken by the students to finish the race. **(2)**

OR

- b. Find the mode of the above given data. **(2)**
- iii. How many students took time less than 60 seconds? **(1)**

176. The India Meteorological Department observes seasonal and annual rainfall every year in different sub-divisions of our country. It helps them to compare and analyse the results. **[4]**



The table below shows sub-divisions wise seasonal (monsoon) rainfall (in mm) in 2023.

Rainfall (mm)	No. of Sub-divisions
200 – 400	3
400 – 600	4
600 – 800	7

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800 – 1000	4
1000 – 1200	3
1200 – 1400	3

Based on the information given above, answer the following questions:

- Write the modal class. **(1)**
- a. Find the median of the given data. **(2)**
OR
b. Find the mean rainfall in the season. **(2)**
- If a sub-division having at least 800 mm rainfall during monsoon season is considered a good rainfall sub-division, then how many sub-divisions had good rainfall? **(1)**

177. India meteorological department observes seasonal and annual rainfall every year in different sub-divisions of our country. **[4]**



It helps them to compare and analyse the results. The table given below shows sub-division wise seasonal (monsoon) rainfall (mm) in 2018:

Rainfall (mm)	Number of Sub-divisions
200-400	2
400-600	4
600-800	7
800-1000	4
1000-1200	2
1200-1400	3
1400-1600	1
1600-1800	1

Based on the above information, answer the following questions:

- Write the modal class. (1)
- Find the median of the given data. (1)
- If sub-division having at least 1000 mm rainfall during monsoon season, is considered good rainfall sub-division, then how many subdivisions had good rainfall? (2)

OR

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Find the mean rainfall in this season. (2)

- 178. Heart Rate:** The heart rate is one of the 'vital signs' of health in the human body. It measures the number of times per minute that the heart contracts or beats. While a normal heart rate does not guarantee that a person is free of health problems, it is a useful benchmark for identifying a range of health issues. **[4]**



Thirty women were examined by doctors of AIIMS and the number of heart beats per minute were recorded and summarized as follows:

Number of heart beats per minute	Number of Women
65 - 68	2
68 - 71	4
71 - 74	3
74 - 77	8
77 - 80	7
80 - 83	4
83 - 86	2

Based on the above information, answer the following questions:

- How many women are having heart beat in the range 68 - 77?
- What is the median class of heart beats per minute for these women?
- a. Find the modal value of heart beats per minute for these women.

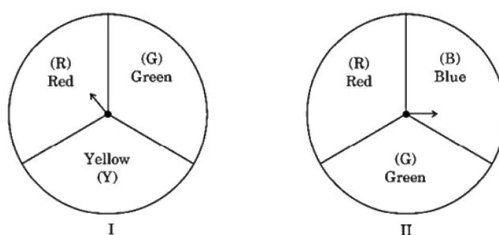
OR

- Find the median value of heart beats per minute for these women.

SECTION - M : PROBABILITY

This section consists of 9 case based questions of 4 marks each.

- 179.** A middle school decided to run the following spinner game as a fund-raiser on Christmas Carnival. **[4]**



Making Purple: Spin each spinner once. Blue and red make purple. So, if one spinner shows Red (R) and another Blue (B), then you 'win'. One such outcome is written as 'RB'.

- List all possible outcomes of the game. (1)
- Find the probability of **Making Purple**. (1)

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

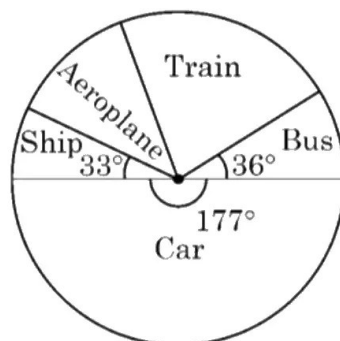
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- iii. For each win, a participant gets ₹ 10, but if he/she loses, he/she has to pay ₹ 5 to the school. If 99 participants played, calculate how much fund could the school have collected. (2)

OR

If the same amount of ₹ 5 has been decided for winning or losing the game, then how much fund had been collected by school? (Number of participants = 99) (2)

- 180.** In a survey on holidays, 120 people were asked to state which type of transport they used on their last holiday. The following pie chart shows the results of the survey. **[4]**



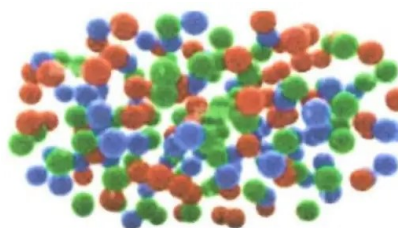
Observe the pie chart and answer the following questions:

- If one person is selected at random, find the probability that he/she travelled by bus or ship. **(1)**
- Which is most favourite mode of transport and how many people used it? **(1)**
- a. A person is selected at random. If the probability that he did not use train is $\frac{4}{5}$, find the number of people who used train. **(2)**

OR

- b. The probability that randomly selected person used aeroplane is $\frac{7}{60}$. Find the revenue collected by air company at the rate of ₹ 5,000 per person. **(2)**

- 181.** Aarav and Ashima are brother and sister and on Ashima's birthday, Aarav gifts her a bag filled with 8 red toffees, 10 green toffees and 6 blue toffees. Ashima decides to randomly draw a toffee from the bag. She wants to find the chances of picking a toffee of specific colour and asks the following questions: **[4]**



- What is the probability of getting a green toffee? **(1)**
- What is the probability of getting a blue toffee? **(1)**
- a. What is the probability of getting a non-red toffee? **(2)**

OR

- b. What is the probability of getting a red or a green toffee? **(2)**

- 182. Family structure:** In a recent survey of this year, 51% of the families in the United States of America had no children, 20% had one child, 19% had two children, 7% had three children and 3% had four or more children. **[4]**

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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A family is selected at random.

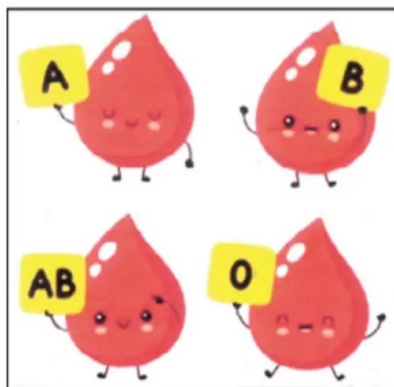
Based on the above information, answer the following questions:

- Find the probability that the selected family has two or three children. **(1)**
- Find the probability that the selected family has more than one child. **(1)**
- a. Find the probability that the selected family has less than three children. **(2)**

OR

- b. Find the probability that the selected family has more than two children. **(2)**

- 183.** Blood group describes the type of blood a person has. It is a classification of blood based on the presence or absence of inherited antigenic substances on the surface of red blood cells. Blood types predict whether a serious reaction will occur in a blood transfusion. In a sample of 50 people, 21 had type O blood, 22 had type A, 5 had type B and rest had type AB blood group. **[4]**



- What is the probability that a person chosen at random had type O blood? **(1)**
- What is the probability that a person chosen at random had type AB blood group? **(1)**
- What is the probability that a person chosen at random had neither type A nor type B blood group? **(2)**

OR

What is the probability that person chosen at random had either type A or type B or type O blood group? **(2)**

- 184.** Computer-based learning (CBL) refers to any teaching methodology that makes use of computers for information transmission. At an elementary school level, computer applications can be used to display multimedia lesson plans. A survey was done on 1000 elementary and secondary schools of Assam and they were classified by the number of computers they had. **[4]**

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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Number of Computers	1 - 10	11 - 20	21 - 50	51 - 100	101 and more
Number of Schools	250	200	290	180	80

One school is chosen at random. Then:

- Find the probability that the school chosen at random has more than 100 computers. (1)
- Find the probability that the school chosen at random has 50 or fewer computers. (2)

OR

Find the probability that the school chosen at random has no more than 20 computers. (2)

- Find the probability that the school chosen at random has 10 or less than 10 computers. (1)

- 185.** Rahul is a lucky charm for his cricket team. He has a jar of cards with numbers from 10 to 74. Before each match, he draws a card from the jar. If the card bears an even number, the team wins. If the number is even and divisible by 5, they win by a big margin. If the number is an odd number less than 30, they win by a small margin. And if the number is a prime number between 50 and 74, they lose. **[4]**



Answer the following questions if Rahul draws a card today:

- What is the probability that Rahul draws a card with an even number? **(1)**
- What is the probability that Rahul draws a card with an odd number less than 30? **(1)**
- a. What is the probability that Rahul draws a card with a prime number between 50 and 74? **(2)**

OR

- What is the probability that Rahul draws a card with an even number divisible by 5? **(2)**

- 186. TERM INSURANCE PLAN** **[4]**

A particular term insurance company has two options in the application form before issuing the policy - Smoker or Non-smoker. As a smoker has more chance of getting lung

UNIQUE STUDY POINT

CLASS X - MATHEMATICS | COMPLETE CASE STUDY QUESTIONS

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disease and death chance is comparatively higher. So premium payment is more for a smoking person. Company gives a rider plan (i.e. for some critical diseases) along with normal term plan by paying some

extra premium money. In a certain time period, company issues 100 policies of which 30% are for smokers and rest for non-smoker customers. Also, half the smokers and $\frac{2}{5}$ th of non-smoking customers have purchased a rider plan along with a normal plan.

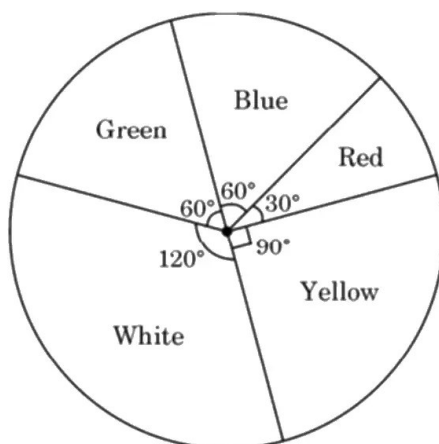


- Find the probability that company issues policy for a smoker with rider plan. (1)
- Find the probability that company issues policy for a non-smoker without a rider plan. (1)
- Find the probability that company issues policy for a smoker without a rider plan. (2)

OR

Find the probability that company issues policy for a non-smoker with rider plan. (2)

- 187.** Some students were asked to list their favourite colour. The measure of each colour is shown by the central angle of a pie chart given below: **[4]**



- If a student is chosen at random, then find the probability of his/her favourite colour being white? (1)
- What is the probability of his/her favourite colour being blue or green? (1)
- If 15 students liked the colour yellow, how many students participated in the survey? (2)

OR

What is the probability of the favourite colour being red or blue? (2)

----- All the Best -----