UT CHANDIGARH EDUCATION DEPARTMENT

CCT PRACTISE (E-CONTENT)

PISA

CLASS - 9TH   (MATHEMATICS-ENGLISH CONTENT)
COMPILED BY: ST. JOHN'S HIGH SCHOOL, CHANDIGARH
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Subject	Medium	Chapter No. & Name	Experiential learning	CCT Literacy Area	Learning Outcomes	Intigration of other subjects with maths
Mathematics	English	1. Number Systems	To calculate interest rate on a saving account in a bank, calculate maximum and minimum weight, quantity and time etc. **Visit to a bank to understand different banking transactions, gymnasium to find weight gained or lost.** .	Quantity	The learner applies logical reasoning in classifying real numbers, proving their properties and using them in differentsituations..	**Punjabi** – Write a formal letter to the bank manager to grant permission to visit the bank
Mathematics	English	2. Polynomials	Dividing pizza into equal pieces, exchanging money, comparing prices, planning vacation trip. Garden, comparison of ages, board games. Number patterns To apply in business & finance management, sports, cooking, etc. **Visit to a hotel management institute, business house**. **Visit to a Grocery store etc..**	Change & Relationship	The learner applies logical reasoning in classifying real numbers, proving their properties and using them in differentsituations..	**Business Studies** – Visit a stock exchange or currency exchange shop.

Mathematics	English	3. Coordinate Geometry	Finding coordinates of different points in a region **Visit to a tourist spot and assessing the map of the region for the location of a point in that area**	Change & Relationship	The learner developsstrategies to locate points in a Cartesian plane. **The learner derives formulae to establish relations for geometrical shapes in the context of a coordinate plane, such as finding the distance between two given points, to determine coordinates of a point between any two given points etc.** .	**Social Studies –** Study the map of the city beautiful. **Science** – Calculate distance using speed, distance and time formula
Mathematics	English	4. Linear Equations in Two Variables	Library, stationery shops, hostel mess, baker's shop, grocery shop, vegetable market, examination, age related problems, tree plantation, etc. **Visit to a market, library, hostel mess, or being part of vanmohatsav drives etc.**	Change & Relationship	The learner relatesthe algebraic and graphical representations of a linear equationin one/two variables and applies the concepts to daily life situations.	**English** – Write a poem on baker's shop, make an advertisement for tree plantation drive **Art** – Draw a poster on tree plantation drive
Mathematics	English	6. Lines and Angles	Types of angles, figures in swings of amusemnt park, study of the map of city beautiful,	Shape & Space	The learner classifies pairs of angles based on their properties as linear, supplementary,	**Social Studies–** In the atlas students are made to find parallel lines, perpendicular lines found on

			any road map, metro map etc. Visit to an amusement park, trip of, bridges, lakes to observe sail boats etc.		complementary, adjacent and vertically opposite and finds value of the one when the other is given. The learner verifies the properties of various pairs of angles formed when a transversal cuts two lines.	the map.. **Art** – Drawing an amusement park scene with understanding of different shapes of the swings in the park.
Mathematics	English	7. Triangles	Decoration pieces, board games for children, placing of ladders along the walls, making triangular traffic signals. **Visit to a traffic park to observe traffic signs, roofs of houses etc.**	Shape & Space	The learner explains congruency of triangles on the basis of the information given about them like (SSS, SAS, ASA, RHS) **The learner works out ways to differentiate between congruent and similar figures**.	**Art and Craft** – To draw or build a model of a 3-D figure of a pyramid using triangles etc.
Mathematics	English	8. Quadrilaterals	Making different toys with different shape objects in a toy making competition in school, Construction work, symmetrical figures, bulletin boards in school, hoardings on roadsides, road signs etc. **Visit to a toy shop,**	Change & Relationship	The learner differentiates between different types of quadrilaterals like parallelogram, square, rectangle etc. The learner applies the properties of quadrilaterals.)	**English** – A conversation between 2 toys describing the different shapes they are made from.

			construction site, buildings, monuments etc. .			
Mathematics	English	9. Areas of Parallelograms and Triangles	In a herbal garden of the school growing of plants in different parts of the field, Used in construction of buildings, printing industry, interior designing (False ceiling), furniture designing and architecture. **Visit to an herbal garden of your school or locality, printing/ furniture factory and construction sites.**	Change & Relationship	The learner relates the areas of two parallelogram , triangle and parallelogram etc	**Art** – Using the concept of parallelograms and the areas to draw a field and divide it into given number of equal parts for growing herbal plants and also labelling the plants with labels of different shapes..
Mathematics	English	10. Circles	Bakery shop for sizes of cakes and pizza , watching IPL match in Mohali Cricket Stadium, Circumference of wheels and alloys. **Visit to the Mohali Cricket Stadium, an auto wheel factory, Restaurants, roundabouts etc.**	Shape & Space	The learner understands the different parts of a circle , angles in a same segment ,cyclic quadrilaterals etc.	**Hindi** – Writing a letter to a friend describing your visit to the Mohali Cricket Stadium. **Social Studies-** Study of the history of the wheel.

Mathematics	English	12. Heron's Formula	Eating nachos, staircase and ladder ,roofs of houses **Celebrating a birthday with nachos , visit to buildings and monuments**	Shape & Space	The learner finds area of triangles using all types of appropriate formulas.. .	**Home Science** – Making nachos and salsa sauce
Mathematics	English	13. Surface Areas and Volumes	Construction of swimming pool in school, construction of school auditorium, playing fields, etc. Finding volume of cylindrical, conical objects. **Visit to an auditorium and swimming pools, temples, monuments, construction sites etc.**	Shape & Space	The learner derives formulas for surface areas and volumes of different solid objects like, cubes, cuboids, right circular cylinders/ cones, spheres and hemispheres and applies them to objects found in the surroundings.	**Sports** – Learning swimming in the school/local swimming pool. **Value Education** – Arranging a fete for the school alumni in the school to collect funds for the construction of the school auditorium
Mathematics	English	14. Statistics	Medical study ,scores of players, population study and weather pattern **Visit to the metrological department , a hospital , cricket or football match etc.**	Uncertainty & Data	The learner identifies and classifiesthe daily life situations in which mean, median and mode can be used. The learner analysesdata by representing it in different forms like, tabular form (grouped or ungrouped), bar graph, histogram(with equalandvaryin gwidth and length), and frequencypolyg on	**Social Studies** – Visit the meteorological department to study about weather predictions
Mathematics	English	15. Probability	Weather forecast department to	Uncertainty & Data	The learner calculatesempiri cal probability	**Hindi** – Skit on how gambling can have ill effects on

			study rainfall, snowfall, Temperature variation, cricket scores, report cards, marks obtained, average hours of sunshine, weather report, climate change, elections, dice games,		through experiments.	the society

CLASS – 9
Chapter 1 and 2 - NUMBER SYSTEM AND POLYNOMIALS

Learning outcomes – The learner applies logical reasoning in classifying real numbers, proving their properties and using them in different situations.

1. A person goes for a walk daily, counts the steps and notes them in a diary. One of his diary pages shows the record of a week in the month of September.

Monday	:	9490
Tuesday	:	9430
Wednesday	:	6264
Thursday	:	8961
Friday	:	11435
Saturday	:	4538

His daily target is 9000 steps.

(i) How many days did he achieve the daily target?

(ii) Approximate and round the steps to nearest 100, what were the maximum and minimum values among the approximations?
(a) Max value = 11400, Min value = 4500
(b) Max value = 12000, Min value = 3500
(c) Max value = 10500, Min value = 4000
(d) Max value = 11500, Min value = 4700

CLASS – 9
Chapter 1 and 2 - NUMBER SYSTEM AND POLYNOMIALS

Learning outcomes – The learner applies logical reasoning in classifying real numbers, proving their properties and using them in different situations.

2. A man is eating a pizza. During the first day he eats the half of the pizza. On the second day, he eats the 1/3 of the remaining part of the pizza. The third day he eats $1/4^{th}$ of what is left and 4th day he eats $1/5^{th}$ of what still remains. He then stops because the last piece was not fresh. What fraction of original pizza is still available?

A) 0.25
B) 1234/2345
C) 0.12345
D) 1/5

CLASS – 9
Chapter 1 and 2 - NUMBER SYSTEM AND POLYNOMIALS

Learning outcomes – The learner applies logical reasoning in classifying real numbers, proving their properties and using them in different situations.

3. In a class, 7 students walk to school, 2/5 ride the bus, and 32% are drop off by the parents. What number is largest?

A) The numbers are the same
B) The number of students who walk to school
C) The number of students who are dropped by their parents
D) The number of students ride the bus

CLASS – 9
Chapter 1 and 2 - NUMBER SYSTEM AND POLYNOMIALS

Learning outcomes – The learner applies logical reasoning in classifying real numbers, proving their properties and using them in different situations.

4. The maximum capacity of the Wembley stadium London, England is 90 thousand. The stadium contains 2618 toilets more than any other venue in the world. There are 78540 people in the stadium now. If they all go to the toilets and they are evenly distributed how long will be the queue? We suppose that there is one seat per toilet.

A) 25 people
B) 40 people
C) 35 people
D) 30 people

CLASS – 9
Chapter 1 and 2 - NUMBER SYSTEM AND POLYNOMIALS

Learning outcomes – The learner applies logical reasoning in classifying real numbers, proving their properties and using them in different situations.

5. You can purchase or rent a car. The car is available at a rental fee of $25 per day (All inclusive). Purchasing a car costs you $40 thousand for the investment and $50 per day. After how many days would the cost of renting and purchasing be equal?

A) 1 year
B) 200 days
C) 225 days
D) 250 days

CLASS – 9
Chapter 1 and 2 - NUMBER SYSTEM AND POLYNOMIALS

Learning outcomes – The learner applies logical reasoning in classifying real numbers, proving their properties and using them in different situations.

6. A report said that for every 100 babies born in a country, there were 12 more girls than boys. What is the highest expected number of girls in a class of 25 children?
   A) 15
   B) 13
   C) 12
   D) 14

Learning outcomes – The learner applies logical reasoning in classifying real numbers, proving their properties and using them in different situations.

7.

A. If a bake sale committee spends Rs. 10,000 in initial start up costs and then earns Rs. 5000 per month in sales. Show a correct relationship between money earned (E) and months they are working for?

a) $E = 5,000 \ M - 10,000$
b) $E = 5,000 \ M + 10,000$
c) $M = 5,000\% \ M + 10,000$

B. After 6 months how much they will earn?

CLASS – 9
CHAPTER 3 - COORDINATE GEOMETRY

Learning outcomes – The learner develops strategies to locate points in a Cartesian plane.

1. Three corners of the square are A (1, 4), B (4,6) and C(4,6). Where is the Fourth corner D?
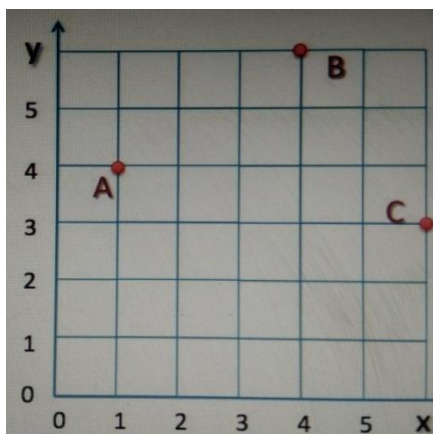
A.   D(3,2)
B.   D(4,2)
C.   D(4,1)
D.   D(3,1)

CLASS – 9
CHAPTER 3 - COORDINATE GEOMETRY

Learning outcomes – The learner develops strategies to locate points in a Cartesian plane.

2. Which shape is closer to the origin?
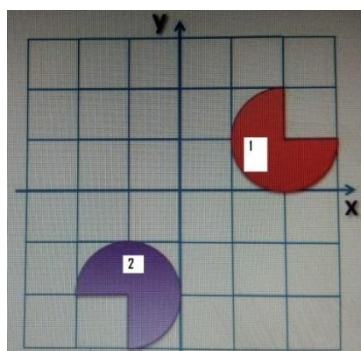
A) No idea
B) Fig. 1
C) Fig. 2
D) Both are at same distance

Learning outcomes – The learner develops strategies to locate points in a Cartesian plane.

3. A jeweler box is placed at the position P. At positions N and M two thieves are standing. Analyze the figure and decide:
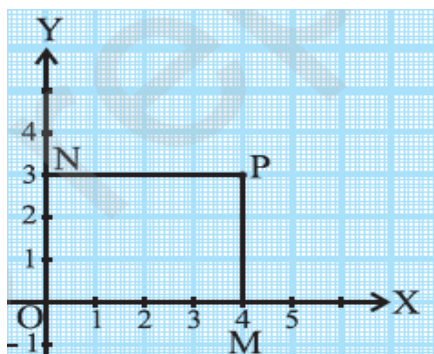
A) Which of the following is true?

I.   N is nearer to box.

II.   M is nearer to box

III.   No one is nearer to box

IV.   Both are at the same distance from the box.

B) What are the coordinates of the box?

I.   (2,3)

II.   (3,4)

III.   (4,3)

IV.   None of these

CLASS – 9
CHAPTER 3 - COORDINATE GEOMETRY

Learning outcomes – The learner derives formulae to establish relations for geometrical shapes in the context of a coordinate plane, such as finding the distance between two given points, to determine coordinates of a point between any two given points etc.

4. Rajesh's school is 5 km away from his house. Rajesh attends Yoga classes in the evening. Distance of Rajesh's house (H) from his school (S) and from his Yoga class (Y) is given in the figure below.

S ●————————● H————● Y

  5 KM   2 KM
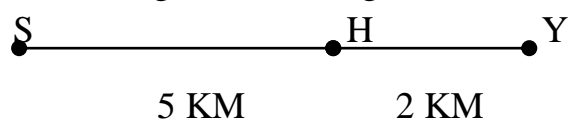
Find the ratio of "distance between Rajesh's school and his home" to "distance between Rajesh's home and Yoga class" choose the correct option:
  I. 5:7
  II. 2:5
  III. 5:2
  IV. 7:5

CLASS – 9
CHAPTER 3 - COORDINATE GEOMETRY

Learning outcomes – The learner derives formulae to establish relations for geometrical shapes in the context of a coordinate plane, such as finding the distance between two given points, to determine coordinates of a point between any two given points etc.

5. Rahul has to travel 3 Km East and then 4 Km North to reach home from school. Parnav has to travel 5 km East and then 6 km north to reach home.
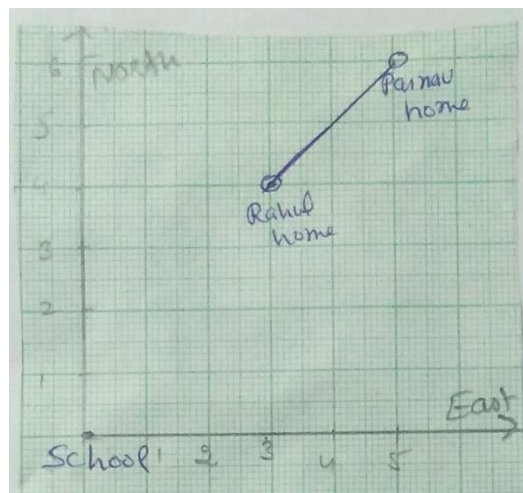
A) What is the shortest distance between school and Rahul's home?

B) Rahul wants to meet Pranav as Pranav was absent from school due to illness. What is the shortest distance which Rahul would travel to reach Pranav home?

CLASS – 9
CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

Learning outcomes – The learner relates the algebraic and graphical representations of a linear equation in one / two variables and applies the concepts to daily life situations**.**

1. Peter went to watch movie. He paid Rs. 360/-.Let

   X –Adult

   Y – Kid

I. Express the problem mathematically

   a) 90x+60y=360

   b) 60x+90y=360

   c) 60x+60y=360

   d) 90x+90y=360

II. Peter paid Rs. 540/- for movie. There are two adults in her family. How many kids are there in family.

   a) 5   b) 6   c) 7   d) 8

III. Peter's sister kusum came. She was excited about the movie. She wants to watch movie with her husband and three kids. Peter also joins them. How much money they have to pay for the movie.

   a) 540   b) 360   c) 450   d) 500

CLASS – 9

CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

Learning outcomes – The learner relates the algebraic and graphical representations of a linear equation in one / two variables and applies the concepts to daily life situations

2. A taxi driver charges rate as shown graphically. He charges some fixed rate and further Rs 5/- for every km.
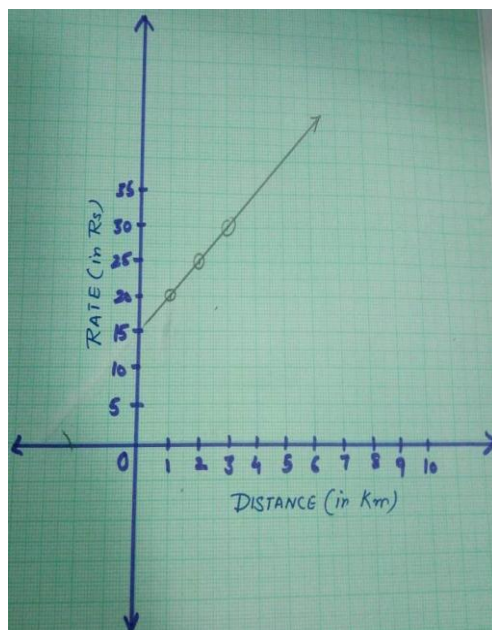
I. What is the fixed rate charged by taxi driver?

   a) Rs 5   b) Rs 10   c) Rs 15   d) Rs 20

II. After 3 km, how much passengers has to pay?

   a) Rs 20   b) Rs 30   c) Rs 40   d) Rs 50

III. Jack paid Rs 55/- to taxi driver. How far is his home from the starting point.

   a) 8 km   b) 6 km

   c) 10 km   d) 11 km

CLASS – 9
CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

Learning outcomes – The learner relates the algebraic and graphical representations of a linear equation in one / two variables and applies the concepts to daily life situations.

3. 100 students of a class X participated in a Maths Olympiad exam conducted by SOF out of them topmost 4 student of that exam qualified for the final round. The data below show how the 4 students selected for the final round attempted the questions and how many they attempted.

Number of Questions answered	Correct Answers	Incorrect Answers	Total Marks
40	20	20	15
38	30	08	28
40	0	32	00
x	50	y	42

Study the table and calculate the

(i) Total number of questions attempted by 4th student?

(ii) Incorrect answers attempted by 4th student?

(iii) Marks allotted to each correct answer?

(iv) Marks deducted for each incorrect answer?

CLASS – 9
CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

Learning outcomes – The learner relates the algebraic and graphical representations of a linear equation in one / two variables and applies the concepts to daily life situations.

4. A survey was conducted in a deer park, they found that at a certain time, the number of heads were 39 and number of legs of deer and of human visitors were 132.

How many deer were there at that specific time?

CLASS – 9
CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

Learning outcomes – The learner relates the algebraic and graphical representations of a linear equation in one / two variables and applies the concepts to daily life situations.

5. Most grocery products include an identifying Bar Code on their wrappers. Many supermarkets use these bar codes for totaling sales at the check out using a light pen to read this code. Shown here is an 8 digit version of one such bar code. The 8 digit bar code number is divided into 3 parts : 1st & 2nd digit (from left) –
Retailer's Code 3rd to 7th digit : Product code. 8th digit.

Check digit for the bar code shown above, the different parts are ;

Retailer Code: 00

Product Code: 34600

Check digit: 9

The check digit is chosen so that

$3 \times$ (1st + 3rd + 5th + 7th digit) + (2nd + 4th + 6th + 8th digit) is exactly divisible by 10.
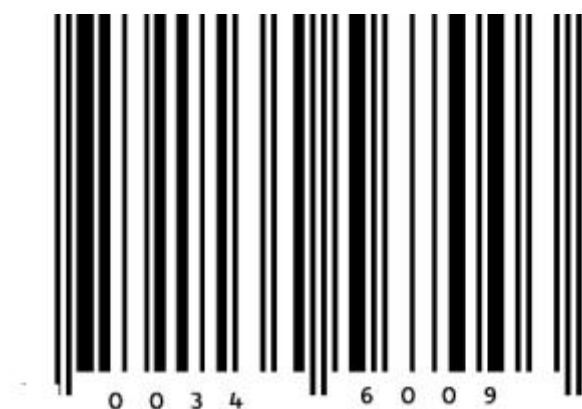
(i) If x is the sum of digits at odd places and y is the sum of digits at even places of a 8 digit bar code, what is the general rule that the code should satisfy?

(a) x + y should be a multiple of 10

(b) 3 + x + y should be a multiple of 10.

(c) 3x + y should be a multiple of 10

(d) 3 (x + y) should be a multiple of 10.

(ii) Shown here is the bar code that was printed on the label of a toy. But the 7th digit of the code was scratched out.
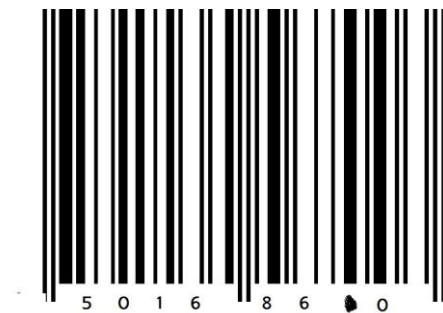
5 0 1 6   8 6   0

Which of the following could be the product code?

(a) 5016860   (b) 50168620   (c) 16864   (d) 16860

CLASS – 9
CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

Learning outcomes – The learner relates the algebraic and graphical representations of a linear equation in one / two variables and applies the concepts to daily life situations.

6. Mary bought one share of stock at 40 points. He watched the price of his stock   everyday   for a week. On Monday, the stock moved 2.5 points up. On Tuesday, it moved 1.76 points down. On Wednesday, it moved 'p' points. On Thursday and Friday, the stock moved 0.75 points up each day. If the price of the stock was 45 points at the end of the week, what is the value of 'p'?
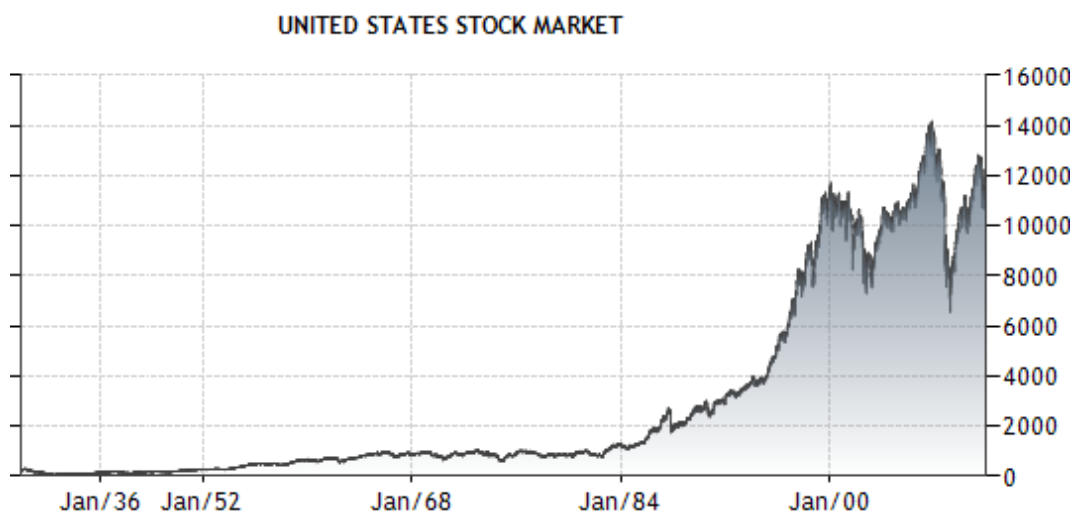
UNITED STATES STOCK MARKET

CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

Learning outcomes – The learner relates the algebraic and graphical representations of a linear equation in one / two variables and applies the concepts to daily life situations.

7. A car magazine uses a rating system to evaluate new cars and gives the award of " The car of the year" to the car with the highest total score. Five new cars are being evaluated, and their ratings are shown in the table.

Car	Safety features (S)	Fuel efficiency (F)	External appearance (E)	Internal fittings (T)
Ca	3	1	2	3
M2	2	2	2	2
Sp	3	1	3	2
N1	1	3	3	3
Kk	3	2	3	2

The ratings are interpreted as follows:

3 points= Excellent

2 points=Good

1   points= Fair
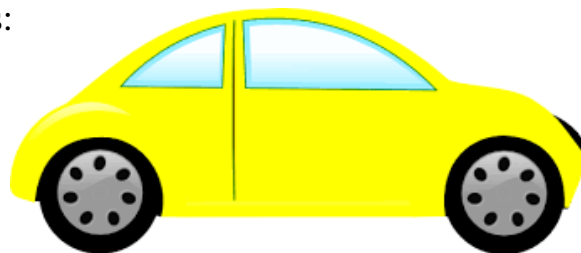
(i) To calculate the total score for a car, the car magazine uses the following
     rule , which is a weighted sum of the individual score points:
   Total score= (3*S) + F+E+T

   Calculate the total score for car "Ca". Write your answer in the space below.
   Total score for "Ca" : _____

CLASS – 9
CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

Learning outcomes – The learner relates the algebraic and graphical representations of a linear equation in one / two variables and applies the concepts to daily life situations

8. **Bakery shop**

   A bakery is an establishment that produces and sells flour based food baked in oven such as bread, cookies, cakes, pastries and pies.

A local bakery is making chocolate chip cookies and bread. Each batch of cookies takes 20minutes to prepare and 10 minutes to bake. Each loaf of bread takes 10 minutes to prepare and 30 minutes to bake. The bakery's management has allotted 800 minutes of employee time (preparation0and 900 minutes of oven time (baking). How many of each should be baked?

CLASS – 9
CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

Learning outcomes – The learner relates the algebraic and graphical representations of a linear equation in one / two variables and applies the concepts to daily life situations

9. You are on an overnight train journey and the power is out. You at any cost want that your phone battery does not die and you remain connected with the world outside. Sadly it reads 70%, you know you will survive till tomorrow (10 hours) if you do not switch it on. You want to watch you tube and play PUBG to kill time. Assuming that you will sleep for 6 hours and active for 4 hours.

   PUBG drain rate p=25% bph

   Normal browsing and U tube drain rate=10% bph

   bph= battery per hour.
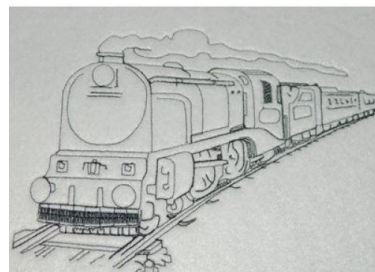
   You want your phone survive with at least 20% of battery till morning. If you play PUBG for 1hour then how many hours you can use your phone for normal browsing and watching U tube videos?

CLASS – 9
CHAPTER 6 - LINES AND ANGLES

 Learning outcomes – The learner verifies the properties of various pairs of angles formed when a transversal cuts two lines.

1. Mr.John is a renowned baker of the city. He baked a cake for the children of orphanage on the occasion of children's day. He prepared a cuboidal cake. The cake was divided into 2 sections. Choco and pine-apple. But at the time of delivery he observed that he did not have that big a box to pack it. So he smartly divided the cake with a diagonal line so that each cake had both the flavours.

CHOCHO

PINEAPPLE

$40°$

TOP VIEW
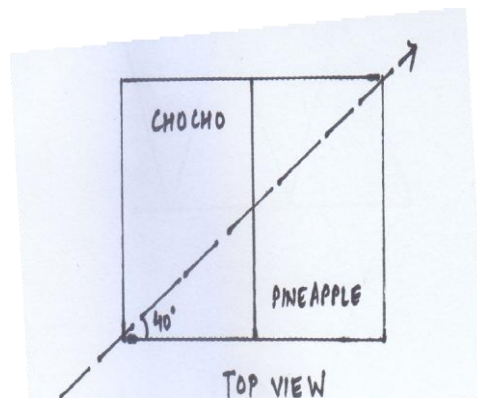
   If the angle of one triangular part is 40 $^{\circ}$; find the angle of the triangular region of the other portion. Give reason for your answer.

CLASS – 9

CHAPTER 6 - LINES AND ANGLES

Learning outcomes – The learner classifies pairs of angles based on their properties as linear, supplementary, complementary, adjacent and vertically opposite and finds value of the one when the other is given.

2. It's Alia birthday today. Six of the friends have come to her home for her birthday party. After having little snacks, everyone has come to the playground for a game. Alia has made a ring with 6 strings attached to it. She puts it on her waist and stands in the middle of the ground and tell seach of the friends to hold the loose end of the string.They all do in such a way that 2 friends each align in line with Alia.
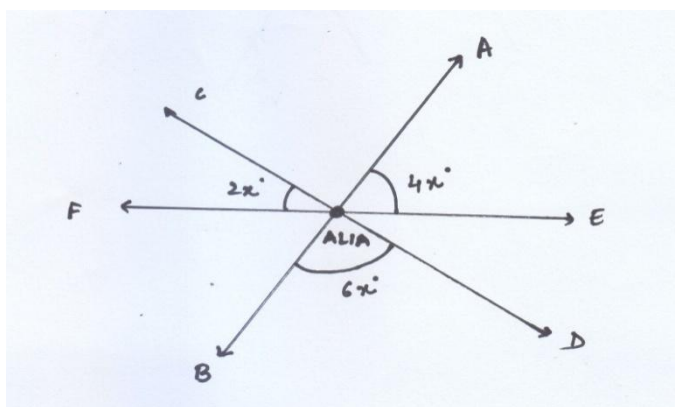
Find at what angles are the friends standing to each other giving the names A,B, C,D,E and F respectively. The conditions are given in the figure above.

Learning outcomes – The learner verifies the properties of various pairs of angles formed when a transversal cuts two lines.

3. Jyoti is a fashion design teacher. Recently she made as are border which she wanted her students to copy. But all of them made different sets. To bring regularity in their work, she gave them the following diagrams to follow; where l // m, p // q and r// s.
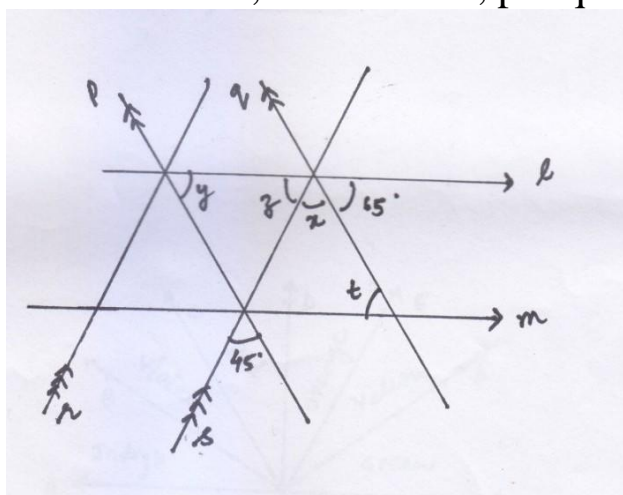
She also asked them a question related to this.

Calculate the value of x, y, z

Learning outcomes – The learner classifies pairs of angles based on their properties as linear, supplementary, complementary, adjacent and vertically opposite and finds value of the one when the other is given.

4. A dance teacher was working with his students, who were standing in the shape of a parallelogram. He then merged them into four lines such that each line originated from half the angle of a parallelogram. The students formed a quadrilateral. Do you think the students are now standing in the shape of a rectangle? If yes, justify your answer.
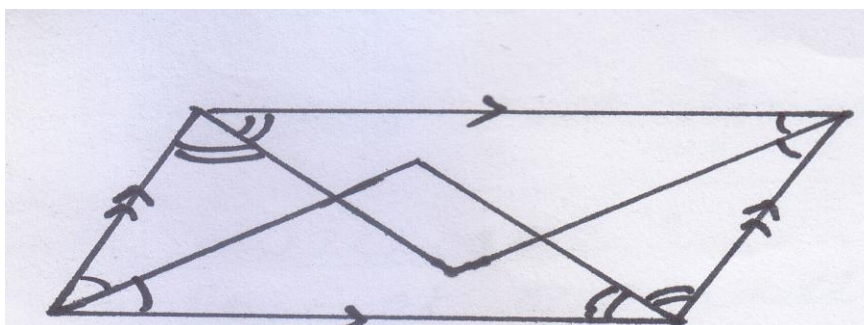
 Learning outcomes – The learner classifies pairs of angles based on their properties as linear, supplementary, complementary, adjacent and vertically opposite and finds value of the one when the other is given.

5. Saumya had a colored paper in the shape of an isosceles triangle with angles measuring 70° and 40°. Mehak asked Saumya to give a portion of paper to her for name slip. Saumya shared exactly half of the paper by folding it from the middle.
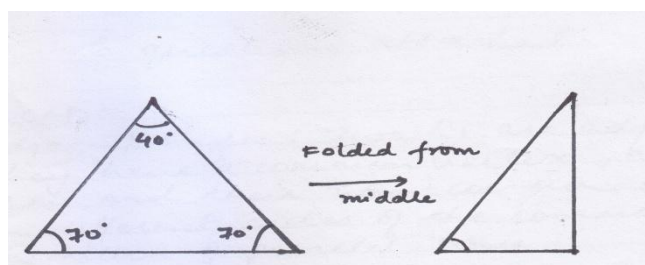
Find the measure of all the angles of the triangle which Mehak has?

 Learning outcomes – The learner works out ways to differentiate between congruent and similar figures.

1. Maths teachers are 100% ORGANIC. They are open-minds, multi-tasking, hard-working and happy to help.
    Find no. of similar triangles in the given figure?

    a) 2
    b) 3
    c) 5
    d) 4

Learning outcomes – The learner works out ways to differentiate between congruent and similar figures.

2. Sophia shines her flashlight into a mirror on the floor and sees the ray of light hit the wall on the other side of the room. As she moves closer to the mirror, holding the light at same height, how will the ray of light on the wall change?

   a) It moves lower down the wall

   b) It stays at the same spot

   c) It moves higher up the wall

   d) None of these.
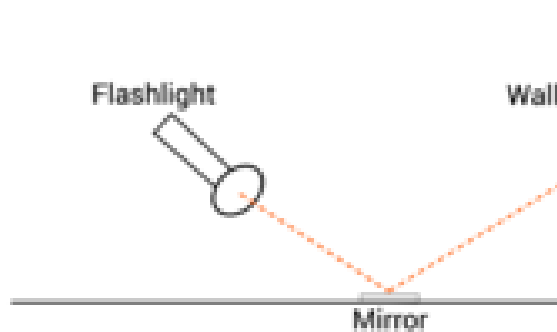
Learning outcomes – The learner works out ways to differentiate between congruent and similar figures.

3. Jeena wants to make a triangular garden in the backyard of her house. The shaded portion is the garden. Now find what fraction of this similar triangle is shaded?
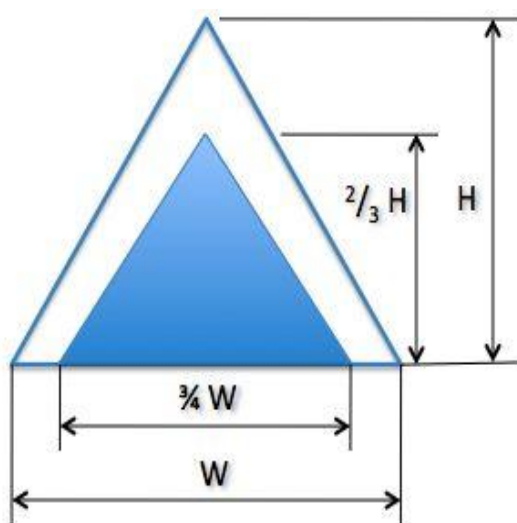
 Learning outcomes – The learner works out ways to differentiate between congruent and similar figures.

4. Six friends are playing a game in which they aligned themselves on the colored positions as shown in figure. What will be the sum of angles formed at their positions?
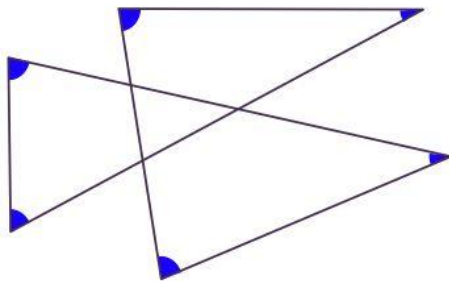
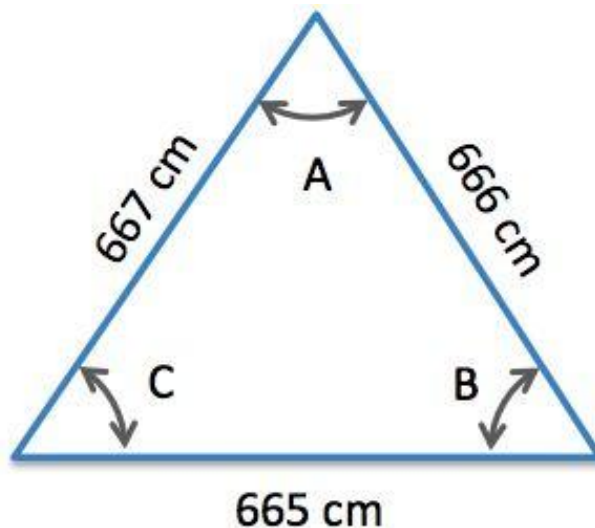# CLASS – 9
CHAPTER 7 – TRIANGLES

Learning outcomes – The learner explains congruency of triangles on the basis of the information given about them like (SSS, SAS, ASA, RHS).

5. Three equilateral triangles form seven unique
   regions. What is the maximum number of regions that
   can be formed by three congruent, overlapping triangles?
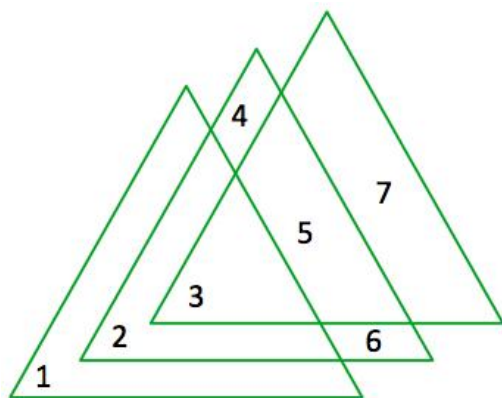
CLASS – 9
CHAPTER 7 – TRIANGLES

Learning outcomes – The learner explains congruency of triangles on the basis of the information given about them like (SSS, SAS, ASA, RHS).

6. Meena has a piece of wire. Out of that piece of wire she wants to form a triangular shaped photo frame by bending the wire such that the sum of two angles of that frame should be equal to the third angle. The lengths of two sides of the frame are 15cm and 17 cm. what will be the length of third side?

CLASS – 9
CHAPTER 7 - TRIANGLES

Learning outcomes – The learner explains congruency of triangles on the basis of the information given about them like (SSS, SAS, ASA, RHS).

7. A curtain covers the window as given in the figure. The window is 24 by 36 inches. How much of the window area is covered by the curtains

Learning outcomes – The learner explains congruency of triangles on the basis of the information given about them like (SSS, SAS, ASA, RHS).

8. Which angle is largest?

a) A

b) B

c) C

d) None of these

667 cm   A   666 cm

C   B

665 cm

Learning outcomes – The learner works out ways to differentiate between congruent and similar figures.

9. Shelly, who is 1.60 m tall, cast a shadow that is 1.25 m long. Her shadow extends to the end of a tree's shadow when she stands 4.75 m from the tree. What is the height of the tree?
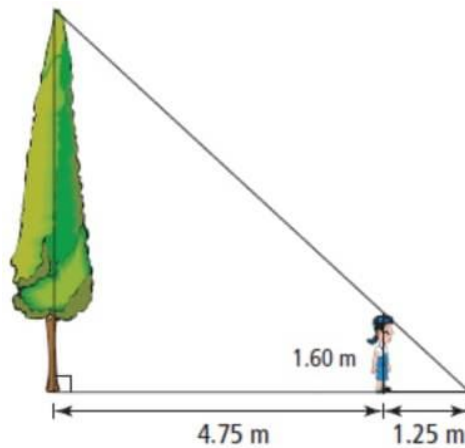
 Learning outcomes – The learner works out ways to differentiate between congruent and similar figures.

10. The guy walks 15m to the left, and then 5m back from the river back to finish at point E. Find the width of the river.
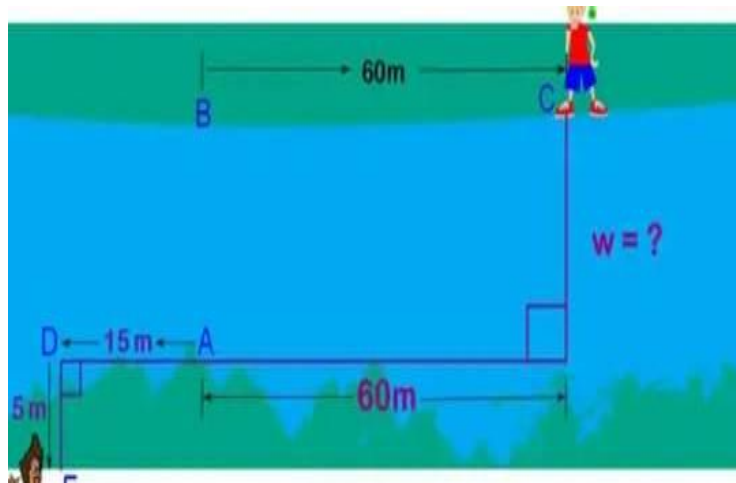
CLASS – 9
CHAPTER 7 – TRIANGLES

Learning outcomes – The learner works out ways to differentiate between congruent and similar figures.

11. A new bridge is going to be built across a river, but the width of the river cannot be measured directly. To measure the width of the river Sham moves from point A to D, then D to E and returns to point C .Find the width of the river.
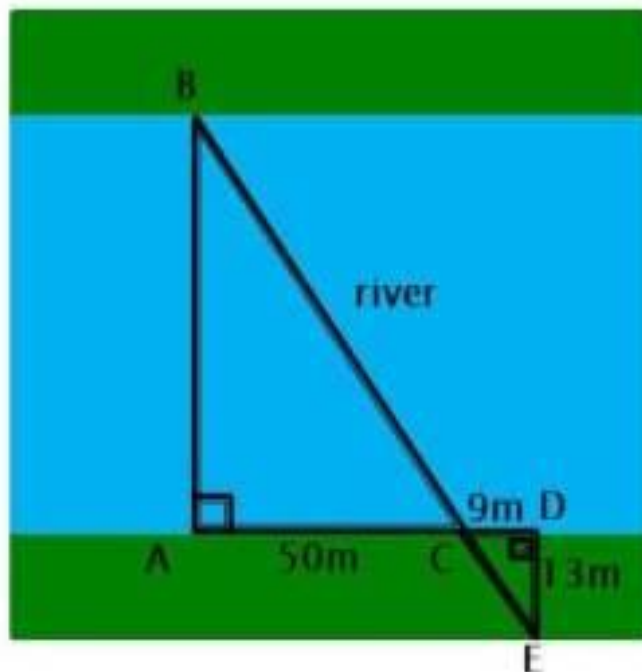
CLASS 9
CHAPTER 8 - QUADRILATERALS

Learning Outcome -The learner differentiates between different types of quadrilaterals like parallelogram, square, rectangle etc.

1. Directorate of Education during a competition held in a school asked few girls to prepare Rangoli in a triangular shape. The dimensions of $\triangle ABC$ are 26 cm, 28 cm, 25 cm. A garland is to be placed along the side of $\triangle PQR$ which is formed by joining the midpoints of side of $\triangle ABC$.
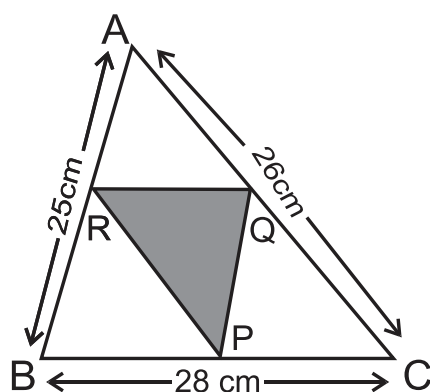
a) Find the lengths of PC and AR.
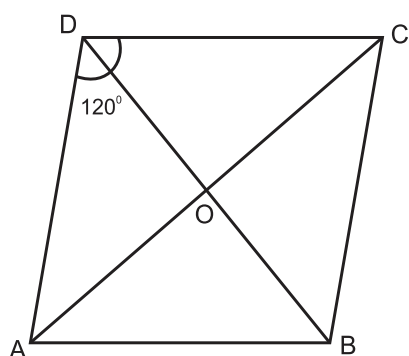b) Find the length of the garland required.

CLASS 9
CHAPTER 8 - QUADRILATERALS

Learning Outcome - The learner differentiates between different types of quadrilaterals like parallelogram, square, rectangle etc.

The learner applies the properties of quadrilaterals.

2. A class teacher gave colored papers to the students of her class. The shape of the paper was a quadrilateral. She asked them to make parallelogram from it using paper folding.

   a) How can a parallelogram be formed by using paper folding?

   b) Prove that it is a parallelogram.

Learning Outcome - The learner differentiates between different types of quadrilaterals like parallelogram, square, rectangle etc.

The learner applies the properties of quadrilaterals.

3. $ABCD$ is a rhombus where $\angle ADC = 120°$. There are two fire stations one at point C and the other one at point D. The fire is reported at point O.
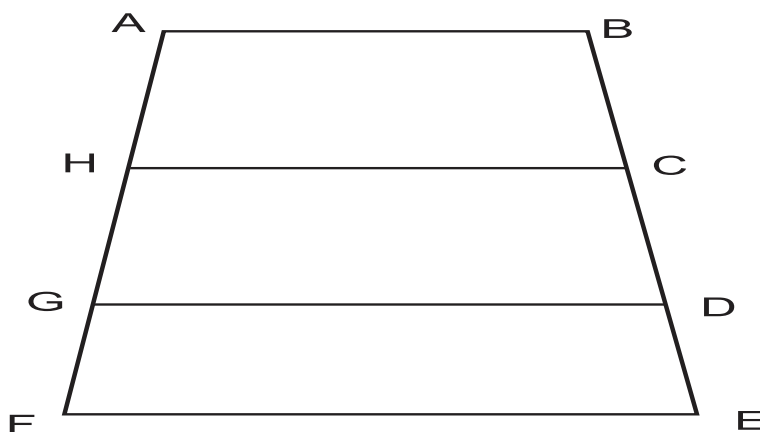

a) Which fire station team can reach early and why?
b) Which value is depicted here?

Learning Outcome - The learner differentiates between different types of quadrilaterals like parallelogram, square, rectangle etc.

The learner applies the properties of quadrilaterals.

4. Sohan wants to show gratitude towards his teacher by giving her a card made by him. He has three pieces of a trapezium pasted one above the other as shown in the fig. These pieces are arranged in way that $AB \parallel HC \parallel GD \parallel FE$. Also $BC = CD = DE$ and $GF = 6\ cm$. He wants to decorate the card by sticking up a coloured tape on the non parallel sides of the trapezium.
Find the total length of the colored tape required if $DE = 4\ cm$.

Learning Outcome - The learner differentiates between different types of quadrilaterals like parallelogram, square, rectangle etc.

The learner applies the properties of quadrilaterals.

5. A farmer has a field in the form of a parallelogram $ABCD$.He has many cows in his cowshed one of which cow is suffering from a disease. To take good care of her, he tied the cow at one corner of the field. The corner angle of the field is $65°$.
   a) Find all the other three angles of the field.
   b) Explain the values depicted here.

Learning Outcome - The learner differentiates between different types of quadrilaterals like parallelogram, square, rectangle etc.

6. A chocolate is in the form of a quadrilateral, with sides $6\ cm, 10\ cm, 5\ cm\ and\ 5\ cm$. It is cut into two parts, along one of its diagonals, by a lady. She gives Part I to her maid and part II is equally divided among her driver and gardener.

Is this distribution fair? Justify it.
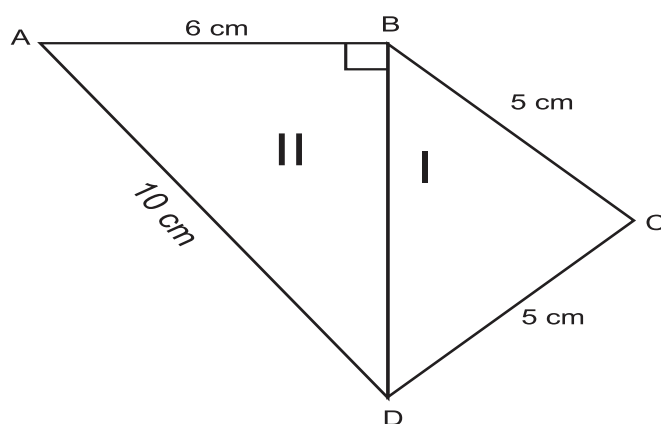
CLASS 9
CHAPTER 8 - QUADRILATERALS

Learning Outcome - The learner differentiates between different types of quadrilaterals like parallelogram, square, rectangle etc.

7. During a Maths Lab Activity, each student was given four broom sticks of lengths $8\ cm, 8\ cm, 5\ cm, 5\ cm,$ to make different types of quadrilaterals.

    a) How many quadrilaterals can be formed using these sticks?
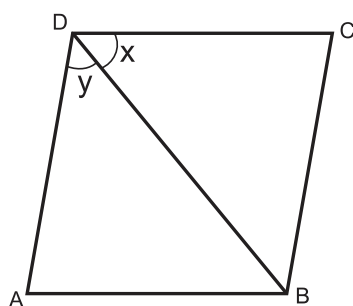
    b) Name the type of quadrilaterals formed.

Learning Outcome - The learner applies the properties of quadrilaterals.

8. While discussing the properties of a parallelogram a teacher asked about the relation between two angles x and y of a parallelogram as shown in the fig..
A teacher gave them three options :

   i)$x > y$ ii) $x < y$ iii) $x = y$


   Beena gave the answer as $x < y$

   a) Is this the correct answer?
   b) Justify the answer with a suitable logic.

Learning Outcome - The learner applies the properties of quadrilaterals.

9. A plot is in the form of a parallelogram $ABCD$. The owner of this plot wants to build an OLD AGE HOME, a DISPENSARY, a PARK and a HEALTH CENTRE for elderly people as shown in the fig. P is a point on the diagonal BD.Is the area alloted to the Old Age Home and the Dispensary same?
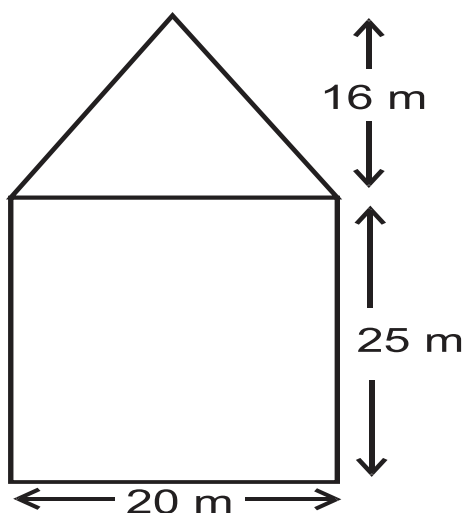
a) Yes
b) No
c) Can't say
d) Data insufficient
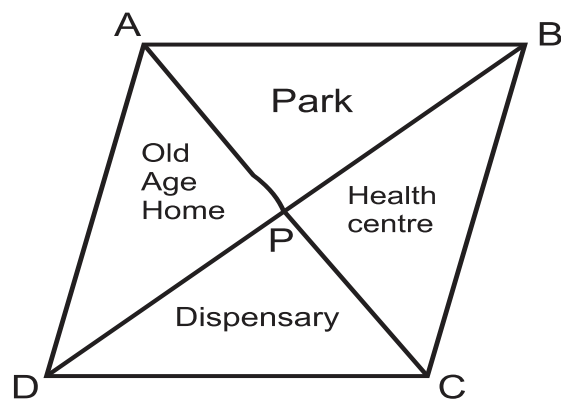
CLASS 9
CHAPTER 8 - QUADRILATERALS

Learning Outcome - The learner applies the properties of quadrilaterals.

10. The front of a building is as shown in the figure:
   a) The rectangular part of the building is desired to be painted in four colors, each covering equal area. The colors to be used are white, red, yellow and blue. Each painted part should be triangular in shape. Suggest how can it be done. What is the area of each part?

   b) If the triangular part on top of the building is to be painted white, will it cost more or less than each part on the rectangular front. (All colors have same rate)

   c) Find the cost of painting the front part at a rate of Rs. 30 perm^3.

Learning Outcome - The learner differentiates between different types of quadrilaterals like parallelogram, square, rectangle etc.

The learner applies the properties of quadrilaterals.

11. A park is in the form of a square of side 320m.
  a) An embankment is to be constructed, at the centre of the park, in the shape of a square. The embankment should be $\frac{1th}{4}$ the area of the park. Find the side of the embankment.

  b) What is the ratio of length of diagonals of the park and length of diagonals of the embankment?

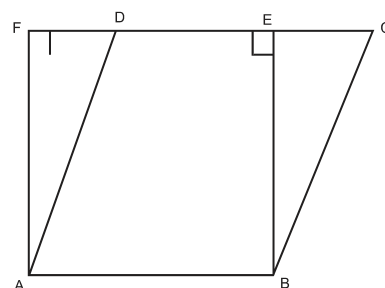 c) Find the cost of fencing the park at the rate of Rs. 20 per m.
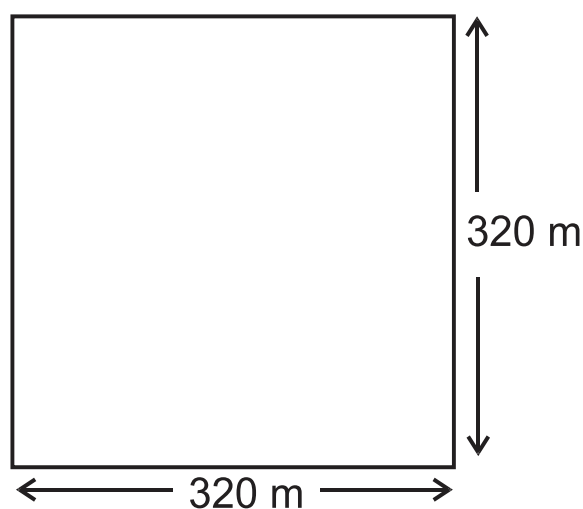
CLASS 9
CHAPTER 9 –AREAS OF PARALLELOGRAMS AND TRIANGLES

Learning Outcome - The learner relates the areas of two parallelograms , triangle and parallelogram.

1. A craft mela is organized by Welfare Association to promote the art and culture of tribal people. The pandal is to be decorated by using string of bulbs all around the field. There are two options either to arrange it in a rectangular field *ABEF* or parallelogram *ABCD* with equal area.

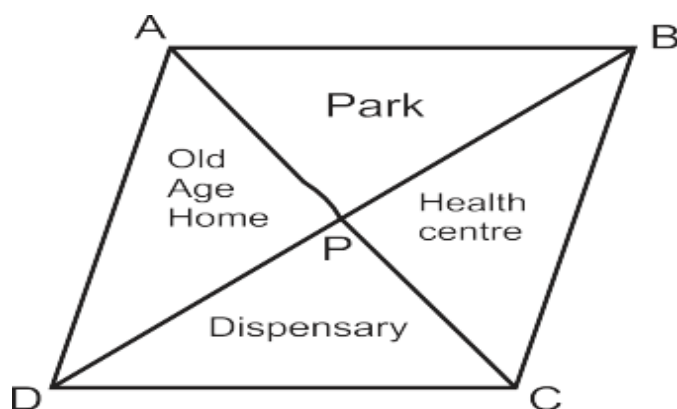   What shape of the field should be chosen to minimize the expense of bulb and why?

Learning Outcome - The learner relates the areas of two parallelograms, triangle and parallelogram.

2. A plot is in the form of a parallelogram $ABCD$. Owner of this plot wants to build OLD AGE HOME, DISPENSARY, PARK and HEALTH CENTRE for elderly people as shown in the fig. P is a point on the diagonal BD.

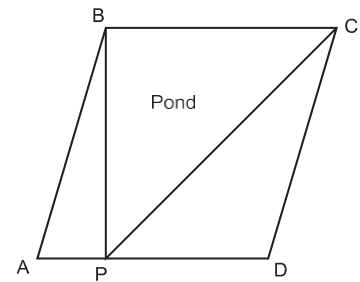   Prove that the area allotted to old age home and dispensary is same.

Learning Outcome - The learner relates the areas of two parallelograms , triangle and parallelogram.

3. There was a deserted land near a colony where people used to throw garbage.

Colony people united to develop a pond in triangular shape as shown in the fig. The land is in the shape of $\|gmABCD$.

In rest of the portion medicinal plants were grown. If area of parallelogram $ABCD$ is $200m^2$.

Calculate the area where medicinal plants were grown.

CLASS 9
CHAPTER 9 –AREAS OF PARALLELOGRAMS AND TRIANGLES

Learning Outcome - The learner relates the areas of two parallelograms , triangle and parallelogram.

4. For 'Sarva Shiksha Abhiyan' a rally was organized by a school. Students were given triangular cardboard pieces to write slogans.

They divided the triangular shape into three equal parts by drawing medians as shown in fig.
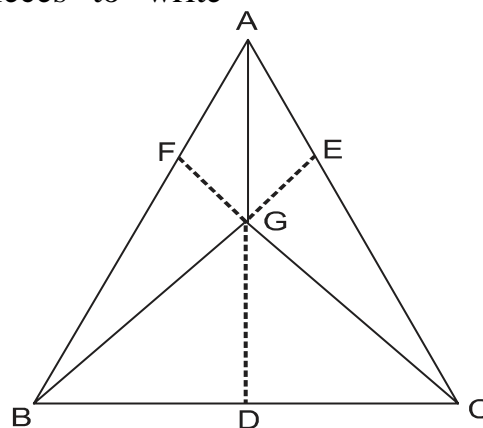
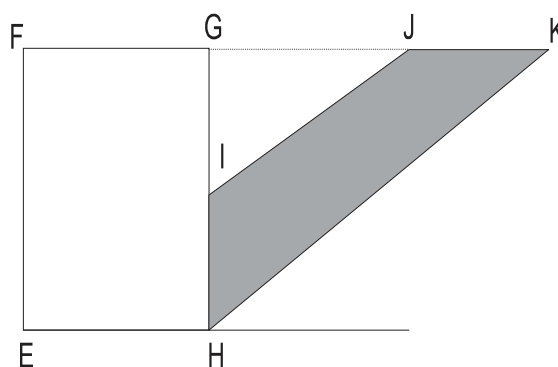Prove that area $(AGC) = area\ (AGB) = area\ (BGC)$

$=\frac{1}{3}\ area$ (ABC)

CLASS 9
CHAPTER 9 –AREAS OF PARALLELOGRAMS AND TRIANGLES

Learning Outcome - The learner relates the areas of two parallelograms , triangle and parallelogram.

5. In the figure below, EFGH is a square of side 4 cm, EJKH is a parallelogram, and I is the midpoint of GH. Points F, G, J and K lie on a straight line.

What is the area of the part of the figure shaded grey?

1. $10cm^2$

2. $12cm^2$

3. $14cm^2$

4. $16cm^2$

CHAPTER 9 –AREAS OF PARALLELOGRAMS AND TRIANGLES

Learning Outcome - The learner relates the areas of two parallelograms , triangle and parallelogram.

6. A farmer having a field in the form of parallelogram $PQRS$. He planned to built a home for old persons of the village in the field leaving open portion equal to portion covered by the home. For this he divided the field by taking a point A on RS and joining AP, Q respectively as shown in figure.

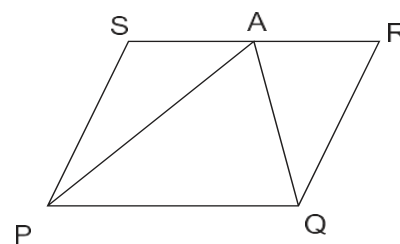(i) How should he do it?
(ii) What values are depicted in his plan?

CLASS 9

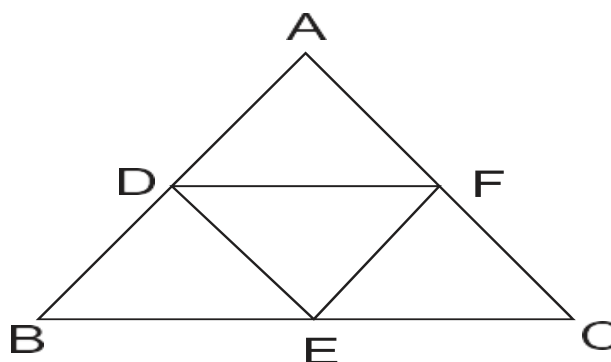## CHAPTER 9 –AREAS OF PARALLELOGRAMS AND TRIANGLES

Learning Outcome - The learner relates the areas of two parallelograms, triangle and parallelogram.

7. Naveen was having a plot in the shape of a quadrilateral. He decided to donate some portion of it to construct a home for orphan girls. Further he decided to buy a land in lieu of his donated portion his plot so as to form a triangle.
   (i)   Explain how this proposal will be implemented?
   (ii)   Which mathematical concept is used in it?
   (iii)   What values are depicted by Naveen?

Learning Outcome - The learner relates the areas of two parallelograms , triangle and parallelogram.

8. Mr. Sharma explains his four children two boys and two girls about distribution of his property among them by a picture of ΔABC such that D, E, F are respectively are joined to divide ΔABC in four triangles as shown in figure.

(i) If total property is equal to area of ΔABC and share of each child is equal to area of each of four triangles, what does each child has share?

(ii) Which mathematical concept is used in it?

(iii) Which values are depicted in Mr Sharma's plan?

CLASS 9
CHAPTER 9 –AREAS OF PARALLELOGRAMS AND TRIANGLES

Learning Outcome - The learner relates the areas of two parallelograms, triangle and parallelogram.

9. In a triangle ABC, D, E and F are the mid –points of BC, AC and AB respectively.

   How will you divide the triangle in three equal parts, justify your answer.

CLASS 9
CHAPTER 9 –AREAS OF PARALLELOGRAMS AND TRIANGLES

Learning Outcome - The learner relates the areas of two parallelograms , triangle and parallelogram.

10. InΔPQR, A, B and C are respectively the mid-points of the sides PQ,R and RS.
   i)   Divide the whole triangle PQR into six parts of equal area.
   ii) How will you divide the given triangle into
   six equal parts?
   iii) Which mathematical concept is used there?

CLASS 9
CHAPTER 9 –AREAS OF PARALLELOGRAMS AND TRIANGLES
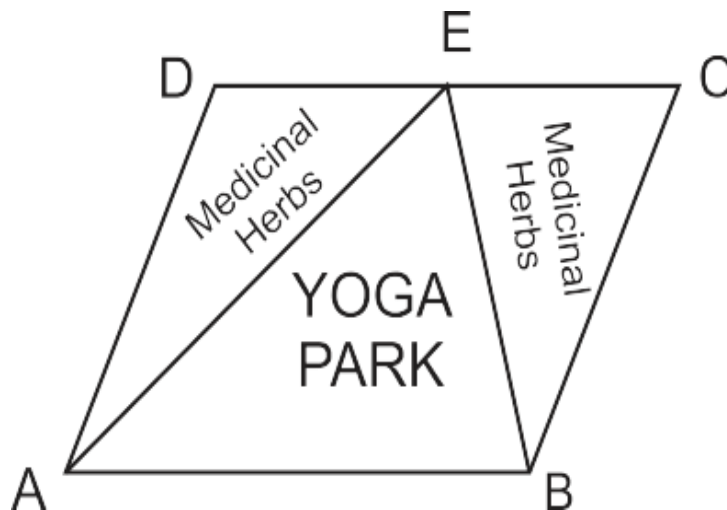
Learning outcome-

The learner relates the areas of two parallelograms, triangle and parallelogram.

11. Members of a housing society in consensus decided to make use of a vacant land of a society by making a yoga park and planting medicinal herbs in the rest of area as shown in figure.

   If the land is in a shape of parallelogram

   $ABCD$ of area $900m^2$,then:

 (i) Which mathematical concept you will use to find the area to yoga park $i.\,e.,ar(\Delta ABE)$?

 (ii)   Find the area of land which will be used to plant medicinal herbs. Which values are depicted by the members of the housing society?

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome - The learner understands the different parts of a circle angles in a same segment ,cyclic quadrilaterals etc.

1. Alisha was asked to designed an emblem for her school. After working on many ideas and designs, she finally settled on the following design. The perimeter of the design is made by alternating semicircle and quarter-circle arcs. Each arc is formed from a circle with a $2\frac{1}{2}$ inch diameter. There are 4 semicircle and 4 quarter-circle arcs, as shown in the diagram below.

   Embroidery Design

   $2\frac{1}{2}$ inches
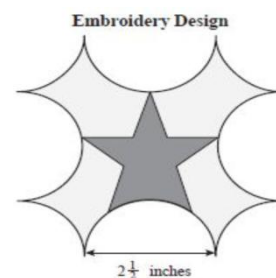
a) She wants to put golden wire on the outer boundary of the design. To calculate the length of the wire required, will she be calculating the Perimeter or the area of the design?
b) What will the length of the wire required?
c) What is the minimum length of square sheet required to cut out this design so that the wastage is minimum?

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome - The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

2. Waterwheels are used in many countries for generating power from water. One such wheel is shown here in the figure.

Raju had one such wheel in his village and after studying about this water wheel as a power generator, he got more curious to know about its working. He went to the river and observed the following:
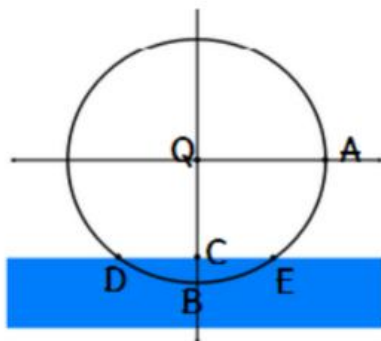
The 24 feet diameter water wheel reaches 3 feet below water level and takes 10 seconds to complete one rotation. He drew the same on a coordinate plane with the centre of the wheel at the origin.

i) if the wheel works for 8 hours in a day, how many rotations does it make in all?

ii) if ∠ DQE = 60°, what length of the wheel remains immersed in water?

CLASS 9

CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

3. Preeti plans to watch a play with her friends in the nearby theatre. While booking the seats online, she observes that the seats in the theatre are arranged in the shape of an arc of a circle as shown in the figure from point E to point F. She observes that the angle of viewing from Point B is 52°. But the seats nearby this Point B are booked. So she decides for the seats near Point A or Point C.

i) Can you help her find out the angle of viewing at point A and Point C?
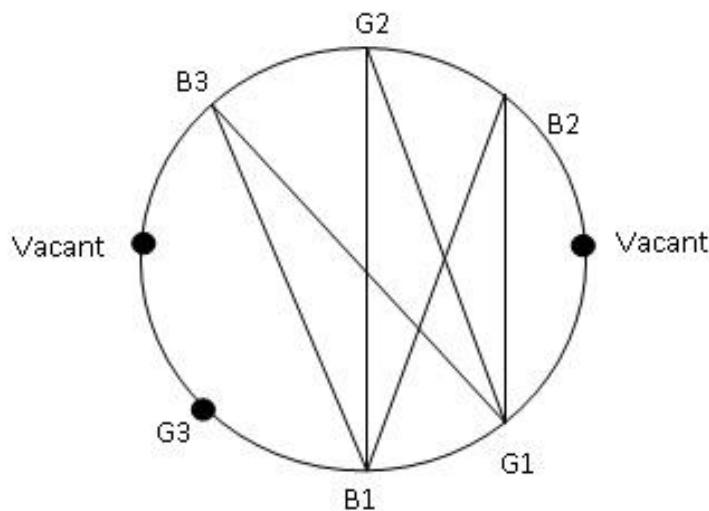
ii) Which concept related to circles has been used here?
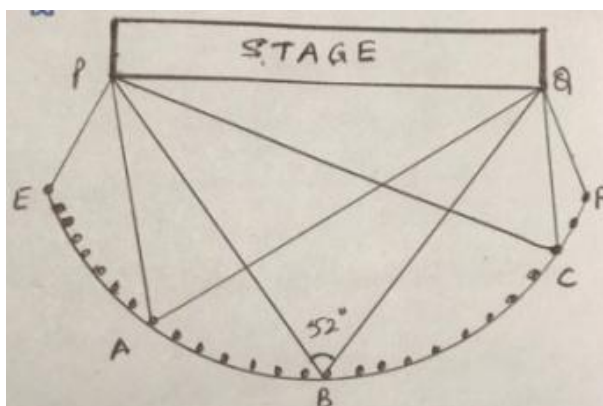
CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

4. In an interstate conference, 3 girls and 3 boys were representing their respective states. The officials made them sit on a circular table with 8 seats, alternatively for a discussion on a certain topic. The arrangement is depicted by the diagram given. If $\angle B_1G_2G_1=40^o$

1. Find the angle between Boy1, Boy3 and Girl1
2. Find $\angle B_1B_2G_1$
3. What relation do you observe between $\angle B_1B_3G_1$ and $\angle B_1B_2G_1$
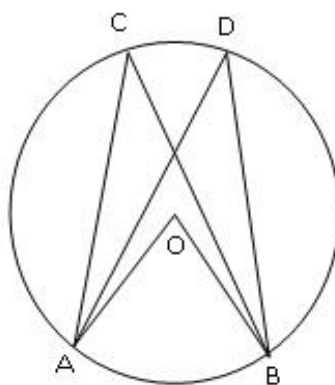
CLASS 9

CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

5. Geeta goes for a walk daily for 30 minutes. But she got late today and could walk only for 20 minutes. When she looked at her watch the angle between the hour hand and the minute hand was 130°. She correlated it to the concept of circles and arc AB, the teacher discussed in her class.
   1. If ∠AOB represents, the hour and the minute hand of the clock, then find ∠ACB.
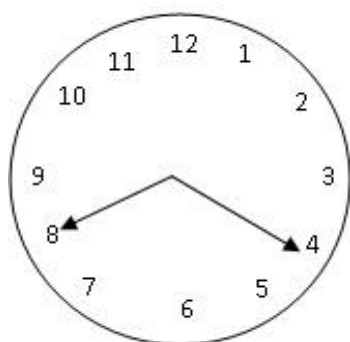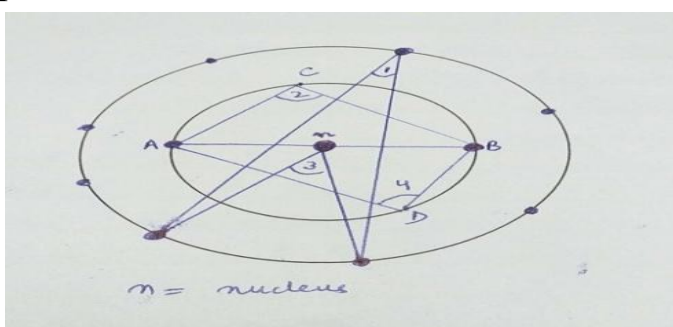   2. Find ∠ ADB, ∠ACB
   3. Is ∠ ACB = ∠ ADB

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

6. In a chemistry class, the teacher was explaining the electronic configuration of element Neon (at. No=10). She made the pictorial representation of one atom of Neon on the blackboard. The small dots representing the electrons in the circular orbital. A student stood up and related the topic to the concept of concentric circles.


If $\angle 1 = 20^{o}$

1. Determine the angle formed by two consecutive electrons of the outer orbital at the nucleus of the atom.
2. Also, if AB acts as the diameter of the inner circle and C & D are any two points in the boundary, find $\angle 2$.
3. Also, find $\angle 4$.
4. What can you say about all such angles in a semi-circle

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

7. A farmer Dishu has a field in circular shape of radius 20m. In his field he had grown orchard in a triangular shape with all its sides equal and all its vertices on the boundary of the circular field. He wishes to fence that particular area with 3 rounds of barbed wire.

   a) Find the side of the triangular orchard.

   b) How much length of barbed wire would he need in all?

   c) If he earns a profit of Rs. 20,000 per 100m2, how much profit would he make from the orchard?
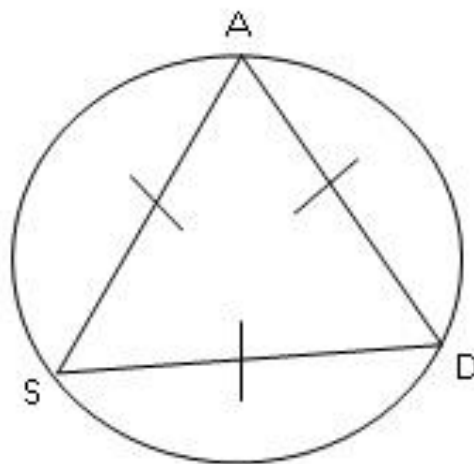
CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

8. A villager Itwaari planned to dig a well in his backyard. He dug a well of radius 5m. In order to help his wife in drawing water from it, he decided to put a triangular plank with 2 sides of 6m each.
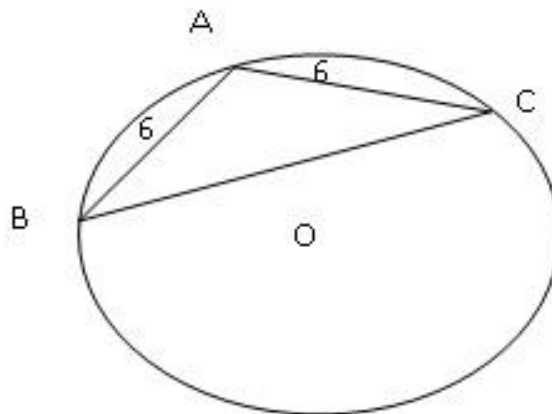
a) Find the length of the 3rd side of the plank
b) How far should he keep the 3rd side of the plank from the centre of the cross section of the well.

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment ,cyclic quadrilaterals etc.

9. Mr. Mehta MC of ANDC society decided to renovate the park on demand of the people living in the society as its condition was not good. He planned to renovate it in circular shape of diameter 500 m. He thought of making a track of 3 m width inside the park with 7 lamp post on outer boundary .

a) Calculate area of Track.

b) Find distance between 2 consecutive lamps.

c) If 1 Km running burns 100 calories. How many rounds one must run to burn 1100 calories.

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment ,cyclic quadrilaterals etc.

10. Arjun baked a chocolate strawberry cake for his friend's birthday. The cake was divided into 2 parts. The inner portion was of strawberry which is surrounded by the chocolate portion. The radius of inner portion is 10 cm and width of the chocolate portion is 6 cm chocolate cake boundary and the top layer is covered with flavored cream.
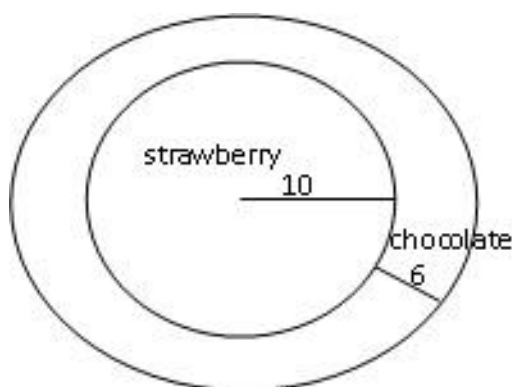
a) If 10 cm^2 of cake used 3 gm of cream and cake is divided into 5 slice of equal area. How much cream does each slice have?

b) How many cherries can be placed in the chocolate part if 1 cherry requires 2cm^2 area.

c) If 12 gm of cream has 3gm fat. How much fat does each slice have?

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment ,cyclic quadrilaterals etc.

11. The Eco club of Government school decided to paint green circles on the boundary wall of the school as a theme for environment day. $\Pi=3.14$
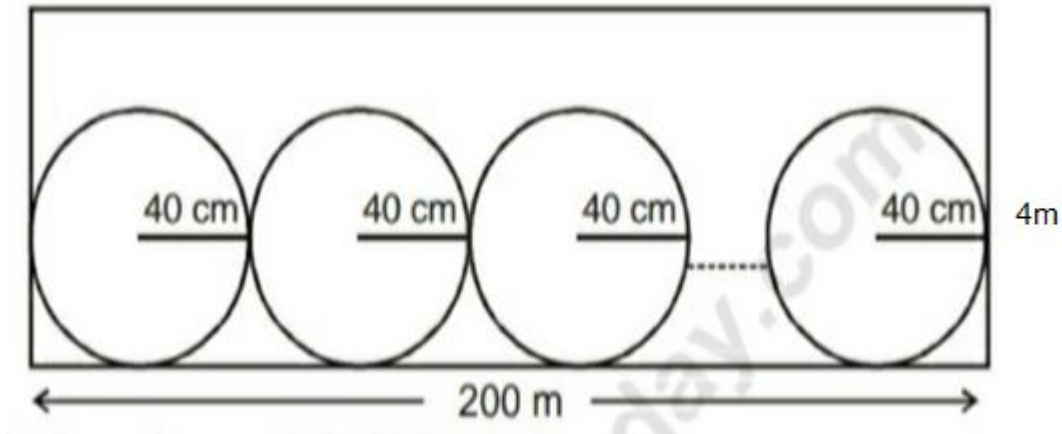
a) If 1 lt. paint cost Rs. 10, find the cost of painting the circles, given that 1 lt paint covers 80 cm^2

b) If the remaining area of the wall to be painted white, how much white paint is required.

Learning outcome- The learner understands the different parts of a circle angles in a same segment ,cyclic quadrilaterals etc.

12. Three identical mementoes are made by a school to award three students from each class for three values – Hardwork , knowledge and tolerance. If each mementos is made as shown in fig.
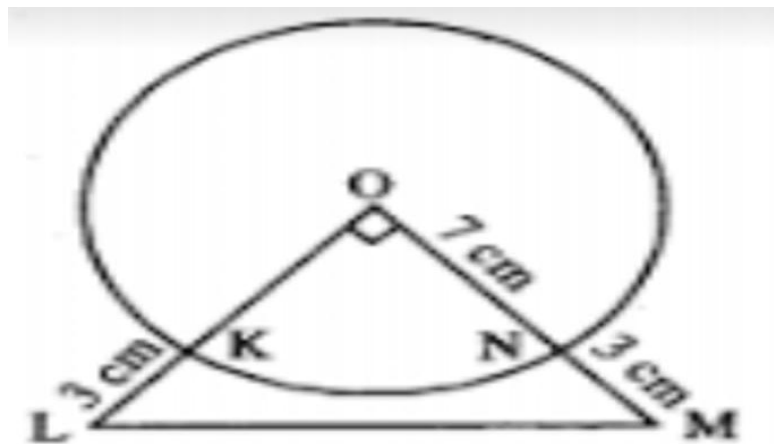
a) Its base is KLMN which is silver plated from the front side @ Rs. 25 per cm^2 . How much school has to pay for silver plating if number of momentos are 30.
b) How much area of momento won't be painted?

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

13. A friendly cricket match is organized between 2 teams. The money won from the match got will be given to a charitable hospital. The field is in the form of a circular ring of uniform width.
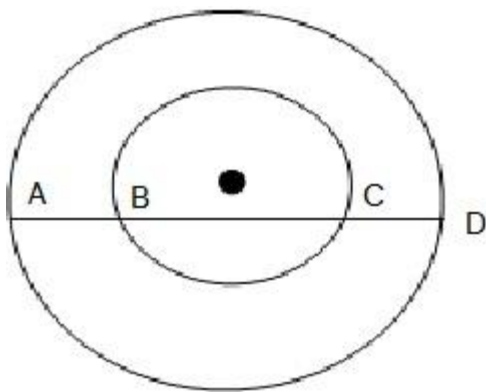
Four players are standing at four points A,B, C and D in a straight line.
A- Aditya
B- Bobby
C- Chetan
D- David

a) Show that the distance between Aditya and Bobby and the distance between Chetan and David is half of the difference of Aditya, David and that of Bobby and Chetan
b) If Chetan is standing at a distance of 10m from centre and 16m away from Bobby while David is standing at 15m from centre. Can you give the approximate distance between Chetan and David?

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

14. The Indian Hockey Federation organized a friendly hockey match between India & Pakistan on a circular ground. The sale proceeds of this match shall be donated to an orphanage.
A rectangular turf is spread on the ground as shown in the figure:

a) Find the radius of the stadium.
b) Calculate the area left uncovered by the rectangular turf.

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

15. Three STD booths situated at A, B & C in the figure are operated by handicapped persons. These three booths are at equal distance from each other as shown in the figure:

    a) Find $\angle$ BOC
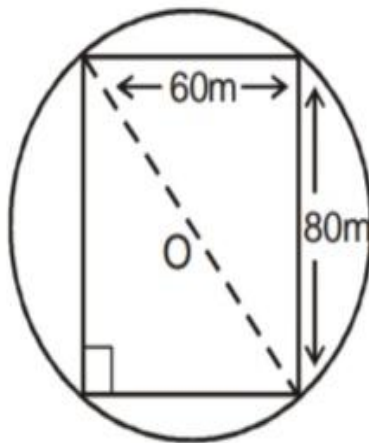   b) If OB= 20 cm, What is the distance between the two booths A & B ?

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

16. Anita went for a shopping. While shopping in the market she saw a jewellery shop with a board outside it. On that board offers for that day were written with a quote ' BIGGEST DEAL OF THE DAY'. Seeing that offer Anita bought a gold bangle. The difference between the circumference and the diameter of a circular bangle in 15cm.
    1. Calculate the radius of Anita's gold bangle.
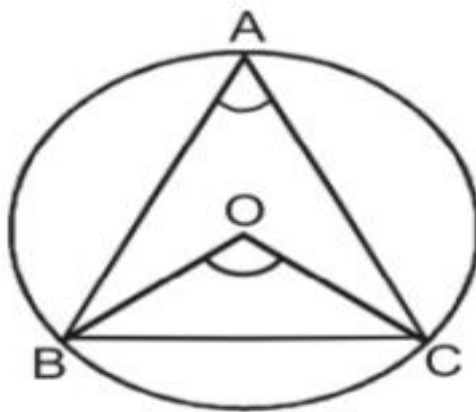   2. If mass of bangle is 40 gms and density of gold is 19.3gm/cm^3. Find the volume of gold used in the bangle.

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

17. A farmer has a circular piece of land of radius 17m. Looking at the rising prices of the fruits and vegetables, he plans to grow few of them and for it he first divides the land into two equal halves and uses one half to grow vegetables. Other half is further divided into two parts by drawing a line AB using one of the end points of the first half and drawing a chord to this portion to grow fruits in the one part and flowers or medicinal plants in the other parts. If the length of the AB is 30m.
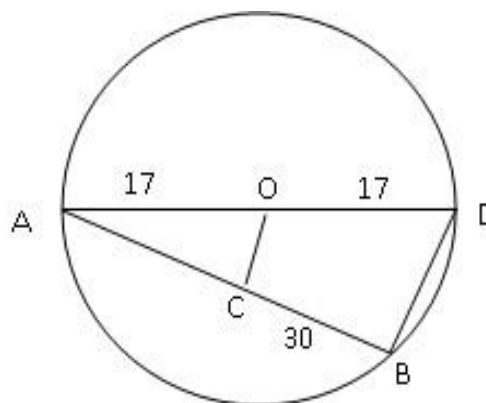
   a) What is the distance of this dividing line (chord) from the center?
   b) What is the area of the land where he grows vegetables

CLASS 9
CHAPTER 10 - CIRCLES

Learning outcome- The learner understands the different parts of a circle angles in a same segment, cyclic quadrilaterals etc.

18. Aakash, Devan and Prabha have saved a good amount from their pocket money. They wish to donate it for a good cause. They sat on a round table of 20 cm radius to decide the mode of donation. In the adjoining figure, Aakash, Devan & Prabha are sitting at A, D and P respectively such that AD=DP=AP i.e ΔADP is an equilateral Δ.
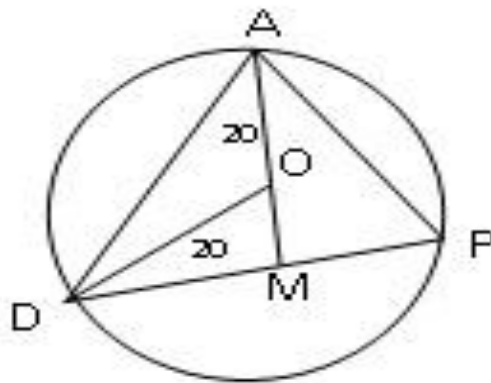
a) Find the distance b/w Aakash, Devan and Prabha.
b) Which Mathematical concept is used in the above problem.

CLASS 9
CHAPTER 12 - HERONS FORMULA

Learning Outcome -The learner finds area of triangles using all types of appropriate formulas

1. A farmer has an isosceles right triangular field to sow different types of crops. He decided to sow wheat, barley, maize and rice in different portions of the field. He divided his field into 3 small triangles and a square. He sows bigger portion of square with rice and 3 triangles with wheat, barley and maize. Also, the area of square portion is 64cm^2. On the basis of the given information, answer the following questions:

   a) If the farmer wants to give one triangular portion to his wife, 1 triangular portion to his daughter, keep 1 triangular portion for himself and the square portion for his son. Find the area of the field that each one gets.
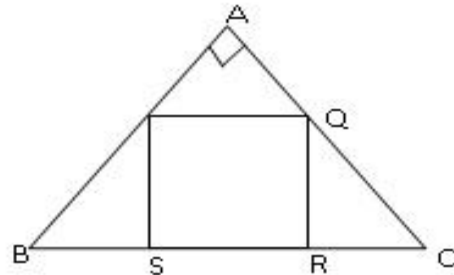
   b) Find the fence required by each person to protect the crops.

   c) If he sows rice at the rate of Rs50 per square meter, find
   The total cost of sowing square portion of the field.

   d) Find the area of the whole triangular field.

   e) If farmer wants to put flags at the equal intervals of 2m around his square field. How many flags will be needed?

CLASS 9
CHAPTER 12 - HERONS FORMULA

**Learning Outcome -**The learner finds area of triangles using all types of appropriate formulas

2. A rich man donated a circular piece of land of diameter 25m to an orphanage centre. The deciding committee of orphanage centre planed a quadrilateral shaped park inside that circular portion as shown in the figure, where the side AC is 20m and BD is 7m. They planned to keep the area of triangle ADB for different swings, slides, see saw etc. and the area of triangle ACB to play different types of games.
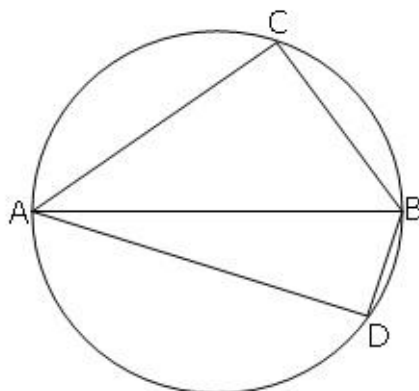
On the basis of above information, answer the following questions:

a) Find the area of the land which is planned for different types of swings, slides, etc.
b) Find the area of the land which is planned for playing different games.
c) If the committee wants to make some seating arrangement in rest of the portion of the circular land, how much area is available for making this arrangement.
d) A sprinkler at the centre of the land can cover an area of 500m^2. Will the sprinkler water the entire land?
e) Find the cost of fencing the quadrilateral shaped land at the rate of Rs300 per metre.

Learning Outcome: The learner derives formulas for surface areas and volumes of different solid objects like, cubes, cuboids, right circular cylinders/ cones, spheres and hemispheres and applies them to objects found in the surroundings.

1. A sports club is replacing its water supply lines for swimming pool. The current system uses two pipes A and B which have circular cross-sections with diameter 6cm and 8cm respectively. The club decides to use a single replacement pipe with the same capacity. What should be the diameter of the new pipe?
   a) 12cm   b) 9cm   c) 14cm   d) 10cm
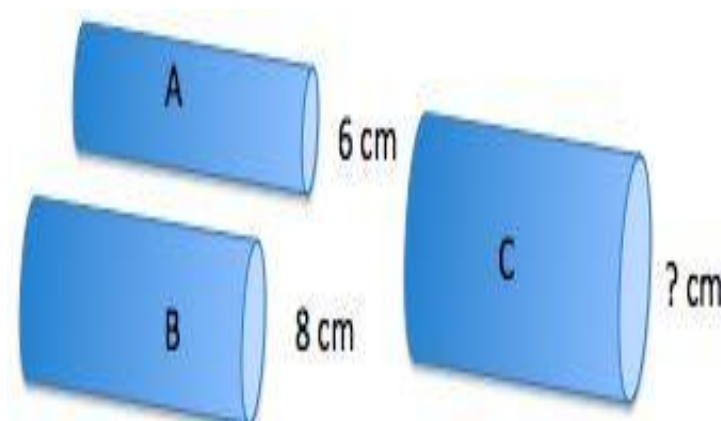
CLASS – 9
CHAPTER 12 –SURFACE AREA AND VOLUME

Learning Outcome: The learner derives formulas for surface areas and volumes of different solid objects like, cubes, cuboids, right circular cylinders/ cones, spheres and hemispheres and applies them to objects found in the surroundings.

2. In a mathematical park, there is triangular park in which 15 pots with circular base are fitted perfectly as shown in figure. What is the largest number of pots that fit into the park if side lengths are increased by 20%?
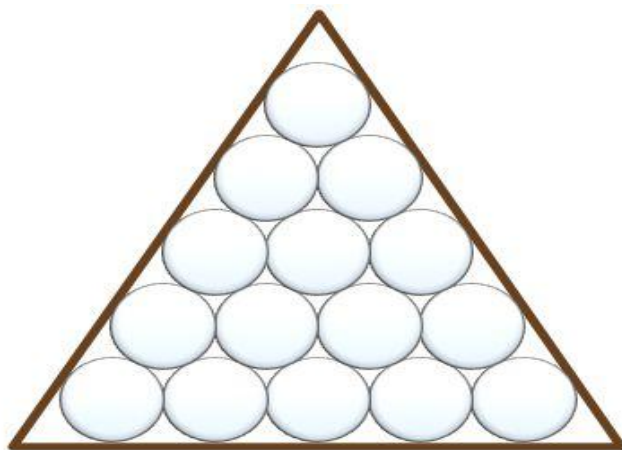
    .

CLASS – 9
CHAPTER 12 –SURFACE AREA AND VOLUME

Learning Outcome: The learner derives formulas for surface areas and volumes of different solid objects like, cubes, cuboids, right circular cylinders/ cones, spheres and hemispheres and applies them to objects found in the surroundings.

3. Reema bought an aquarium from a fair but after 2 months she realized that the filter had broken due to which she has to replace the filter as well as the water in the tank. The tank was full of water she tipped it on one side so 5litres are left. How much water does the aquarium hold when it is full of water?

a) 11 Litres
b) 12 Litres
c) 12.5 Litres
d) 16 Litres

CLASS – 9
CHAPTER 12 –SURFACE AREA AND VOLUME

Learning Outcome: The learner derives formulas for surface areas and volumes of different solid objects like, cubes, cuboids, right circular cylinders/ cones, spheres and hemispheres and applies them to objects found in the surroundings.
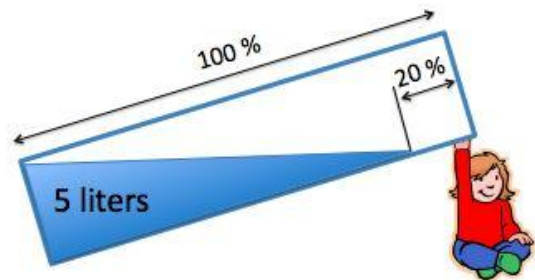
4. Ram a farmer managed to grow shaped- watermelons inside glass cases of 4 different shapes. The shapes he used were: a perfect cube, hemi-spherical, a cuboid, cylindrical along with normal spherical shaped watermelons. Thickness of the skin was same for all the shapes. Each of the glass cases was so designed that the total volume and the weight of all the watermelons would be equal irrespective of the shape.

A customer wants to buy watermelon for making juice, for which the skin of the watermelon has to be peeled off and therefore is a waste. Which shape should the customer buy?

a) Cube
b) Hemisphere
c) Cuboid
d) Cylinder
e) Normal spherical

CLASS – 9
CHAPTER 12 –SURFACE AREA AND VOLUME

Learning Outcome: The learner derives formulas for surface areas and volumes of different solid objects like, cubes, cuboids, right circular cylinders/ cones, spheres and hemispheres and applies them to objects found in the surroundings.

5. Riya bought a Delmonte can from the supermarket, she wants to use the can afterwards as a flower pot by wrapping a foil around it. The can has a radius 7cm and a height 14cm.

i) What should be the dimensions of the foil that riya should buy?

ii)What is the area of this sheet?

iii)How much money she needs to spend of cost per cm^2 is Rs 0.75

iv)She has Rs. 1000in her pocket. Can she buy one more sheet with the same dimensions? Justify

CLASS – 9
CHAPTER 12 –SURFACE AREA AND VOLUME

Learning Outcome: The learner derives formulas for surface areas and volumes of different solid objects like, cubes, cuboids, right circular cylinders/ cones, spheres and hemispheres and applies them to objects found in the surroundings.

6. Four horses are tethered at four corners of a square field of side 70 metres so that they can just about reach one another. The area left ungrazed by the horses is

a) 1050 m^2

b) 3850 m^2.

c) 950 m^2.

d) 1075 m^2.

CLASS – 9
CHAPTER 14 – STATISTICS

Learning Outcome: The learner identifies and classifies the daily life situations in which mean, median and mode can be used.

The learner analyses data by representing it in different forms like, tabular form (grouped or ungrouped), bar graph, histogram(with equal and varying width and length), and frequency polygon

1. In a school there are 12 classes. Each class has two sections. Number of students of each class were noted as given below:

    35,36,40,40,35,40,40,41,42,43,40,40,
    35,37,36,37,37,37,40,40,40,41,41,41

    A grouped frequency distribution with class intervals of equal sizes 33-36 as one of the class interval is constructed-

   A. The frequency of the class interval 39-42 is-
    - a) 11
    - b) 6
    - c) 13
    - d) 3

   B. In the class interval 36-39,39-42 the number 39 is included in which of the following –
    - a) 36
    - b) 33-36
    - c) 36-39
    - d) 39-42

   C. Later it was observed that number of students in one section of class 12 was wrongly noted as 41 instead of 42. After correction the median of above observations is:
    - a) 41
    - b) 40
    - c) 42
    - d) 37

CLASS – 9
CHAPTER 14 – STATISTICS

Learning Outcome: The learner identifies and classifies the daily life situations in which mean, median and mode can be used.

The learner analyses data by representing it in different forms like, tabular form (grouped or ungrouped), bar graph, histogram (with equal and varying width and length), and frequency polygon

2. The bar graph shown in figure represents the circulation of newspaper in 5 languages. Study the bar graph and answer the following questions:

A. What is the total number of newspapers published in Hindi, English, Urdu, Punjabi and Bengali
   a) 2400
   b) 2500
   c) 2600
   d) None of these

B. What will be the mode language among all 5 languages displayed in graph?
   a) Urdu
   b) Punjabi
   c) Hindi
   d) English

C. State the language in which the least number of newspapers is circulated –
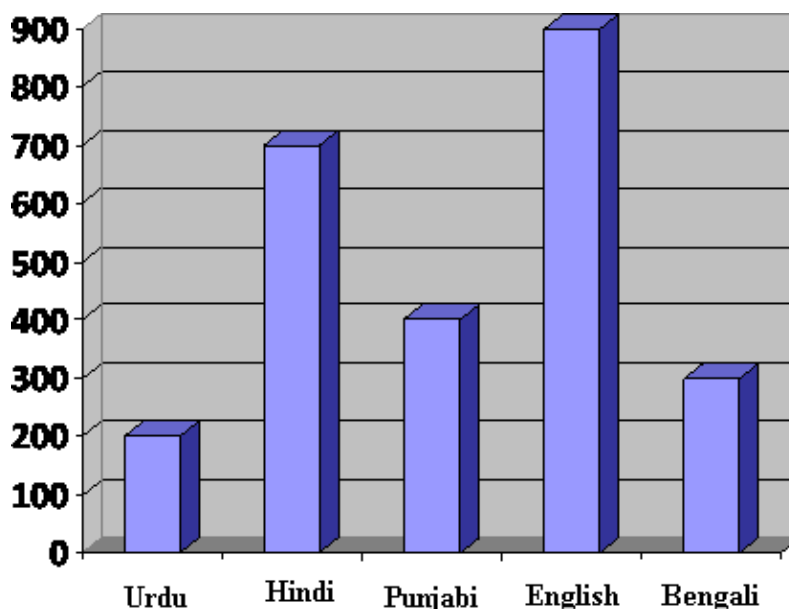   a) English
   b) Hindi
   c) Punjabi
   d) Urdu

CLASS – 9
CHAPTER 14 – STATISTICS

Learning Outcome: The learner identifies and classifies the daily life situations in which mean, median and mode can be used.

The learner analyses data by representing it in different forms like, tabular form (grouped or ungrouped), bar graph, histogram (with equal and varying width and length), and frequency polygon

3. The mean monthly salary of 10 members of a group is Rs 1445, one more member whose monthly salary is Rs 1500 has joined the group. Find the mean monthly salary of 11 members.

CLASS – 9
CHAPTER 14 – STATISTICS

Learning Outcome: The learner identifies and classifies the daily life situations in which mean, median and mode can be used.

The learner analyses data by representing it in different forms like, tabular form (grouped or ungrouped), bar graph, histogram (with equal and varying width and length), and frequency polygon

4. Ashok collected the data of ages of the all the elders of his family. What will be the median age (in years) of his family.

   19, 25, 59,48,35,31,30,32,51

   Later Ashok replaces the age 25 of his elder brother with his maternal uncle's age 52. What will be the new median..

CLASS – 9
CHAPTER 14 – STATISTICS

Learning Outcome: The learner identifies and classifies the daily life situations in which mean, median and mode can be used.

The learner analyses data by representing it in different forms like, tabular form (grouped or ungrouped), bar graph, histogram (with equal and varying width and length), and frequency polygon

5. The following graphs shows the speed of vehicles on highway. Find the mean and median of the speeds displayed in the graph.

Learning Outcome: The learner identifies and classifies the daily life situations in which mean, median and mode can be used.

The learner analyses data by representing it in different forms like, tabular form (grouped or ungrouped), bar graph, histogram(with equal and varying width and length), and frequency polygon

6. A sociologist chose 300 students at random from each of the two schools and asked each student how many siblings he or she has. The results are shown in table below:

No. of Siblings	School 1	School 2
0	80	100
1	80	110
2	60	30
3	30	20
4	50	40

What is the median number of siblings for all the students surveyed?

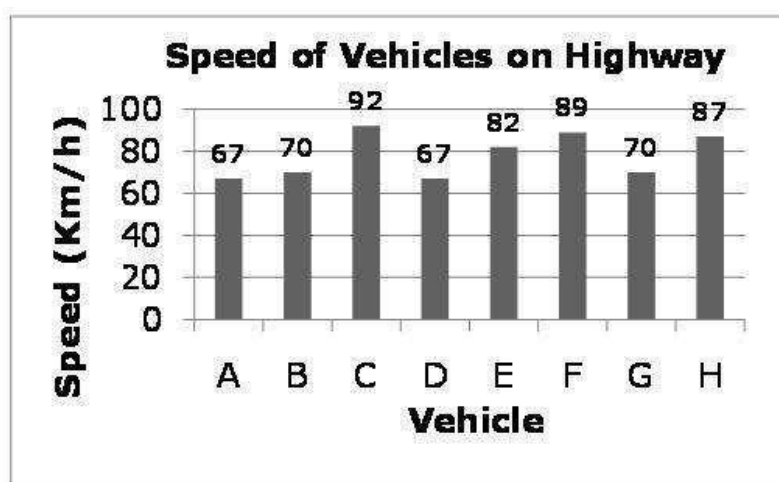# CLASS – 9
CHAPTER 14 – STATISTICS

Learning Outcome: The learner identifies and classifies the daily life situations in which mean, median and mode can be used.

The learner analyses data by representing it in different forms like, tabular form (grouped or ungrouped), bar graph, histogram (with equal and varying width and length), and frequency polygon

7. A study was done on the weights of different types of fish in a pond. A random sample of fish were caught and marked in order to ensure that none were weighed more than once. The sample contained 150 largemouth bass, of which 30% weighed more than 2 pounds. Which of the following conclusions is best supported by the sample data?
   a) The majority of all fish in the pond weigh less than 2 pounds.
   b) The average weight of all fish in the pond is approximately 2 pounds.
   c) Approximately 30% of all fish in the pond weigh more than 2 pounds.
   d) Approximately 30% of all largemouth bass in the pond weigh more than 2 pounds.

CLASS – 9
CHAPTER 15 – PROBABILITY

Learning outcomes – The learner calculates empirical probability through experiments.

1. Two friends were talking about their birthdays, one said my birthday will fall on last Sunday of this year. What is the Probability of having his birthday on 53rd Sunday, the year being 2016.

A) $\dfrac{1}{7}$

B) $\dfrac{2}{7}$

C) $\dfrac{3}{7}$

D) $\dfrac{4}{7}$

 Learning outcomes – The learner calculates empirical probability through experiments.

2. Friends were playing a game of cards called bluff, one of their friends is very good at this game and being not caught any time, he throws wrong cards. A card is thrown by him from a well shuffled deck of 52 playing cards. He said, it is an ace, Find the probability that it is not an ace.

A) $\dfrac{11}{13}$

C) $\dfrac{12}{13}$

B) $\dfrac{10}{13}$

D) $\dfrac{1}{13}$

 Learning outcomes – The learner calculates empirical probability through experiments.

3. Amit, his sister along with their two friends were playing Business. To reach to any of airport, Amit require a pair of prime numbers on die. What will be the probability to reach airport ?

A) $\dfrac{1}{4}$

C) $\dfrac{3}{4}$

B) $\dfrac{1}{9}$

D) $\dfrac{1}{6}$

CLASS – 9
CLASS – 9
CHAPTER 15 – PROBABILITY

 Learning outcomes – The learner calculates empirical probability through experiments.

4. On one page of a telephone directory, there were 200 telephone numbers.

   The frequency distribution of their unit place digit (for example, in the number 24416466, the unit place digit is 6) is given in table

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	20	26	24	22	10	20	18	24	22	14

   Without looking at the page, the pencil is placed on one of these numbers, i.e., the number is chosen at *random*. What is the probability that the digit in its unit place is 8?

A) $\dfrac{9}{100}$

C) $\dfrac{11}{100}$

B) $\dfrac{5}{108}$

D) $\dfrac{1}{108}$

Learning outcomes – The learner calculates empirical probability through experiments.

5. Three coins are tossed to decide which team will be batting first by choosing best of two, Find the probability of getting at least two heads.

A) $\dfrac{1}{2}$

C) $\dfrac{1}{4}$

B) $\dfrac{3}{4}$

D) None of these

CLASS – 9
CHAPTER 15 – PROBABILITY

Learning outcomes – The learner calculates empirical probability through experiments.

6. Anil was playing with his brother, they were counting the numbers on two die. They decided to count equal digits on two die together. What is probability pair of die will not show equal digits.

A) $\dfrac{5}{6}$

C) $\dfrac{1}{6}$

B) $\dfrac{1}{6}$

D) $\dfrac{2}{3}$

CLASS – 9
CHAPTER 15 – PROBABILITY

 Learning outcomes – The learner calculates empirical probability through experiments.

7. Ritu and Shyam were asking their mother for a movie. Mother insisted that its not the right time to go for a movie. But after a long discussion she kept a condition that two will go for a movie if, the sum of numbers appearing and showing on two dice is 8, given that at least one of the dice doesn't show 5. Find the probability that they will go out to watch movie

CLASS – 9
CHAPTER 15 – PROBABILITY

 Learning outcomes – The learner calculates empirical probability through experiments.

8. Of the 750 participants in a professional meeting, 450 are female and $\frac{1}{2}$ of the female and $\frac{1}{4}$ of the male participants are less than thirty years old. If one of the participants will be randomly selected to receive a prize, what is the probability that the person selected will be less than thirty years old?

CLASS – 9
CHAPTER 15 – PROBABILITY

Learning outcomes – The learner calculates empirical probability through experiments.

9. On her vacations Veena visits four cities (A, B, C and D) in a random order. What is the probability that she visits
    (i) A before B
     (ii) A before B and B before C
     (iii) A first and B last.

CLASS – 9
CHAPTER 15 – PROBABILITY

Learning outcomes – The learner calculates empirical probability through experiments.

10. A coin is tossed. If head comes up, a die is thrown but if tail comes up, the coin is tossed again. Find the probability of obtaining
    (i) Two tails
    (ii) head and   number 6

CLASS – 9
CHAPTER 15 – PROBABILITY

Learning outcomes – The learner calculates empirical probability through experiments.

11. Use simulation to determine the experimental probability that a family with 3 children contains at least one boy and at least one girl (if you use two colour counters, for example, red may represent a boy and yellow may represent a girl).

ANSWERS
Chapter 1 and 2 - NUMBER SYSTEM AND POLYNOMIALS

1. (i) 3 days
    (ii) (a)
2. D
3. D
4. D
5. B
6. D
7. A. a)   B. E= Rs 20000

CHAPTER 3 - COORDINATE GEOMETRY

1. D
2. D
3. A) (ii) M is nearer to box P
   B) (iii) (4,3)
4. (iii), 5:2
5. A) 5 km   B) $2\sqrt{2}$ km

CHAPTER 4 - LINEAR EQUATIONS IN TWO VARIABLES

1. (I)   a) 90x+60y=360
    (II)   b) 6
    (III)   c) 450

2. (I)   c) Rs 15
    (II)   b) Rs 30
    (III)   a) 8 km

3. (i)   82
    (ii)   32
    (iii)   1
    (iv)   0.25

4. 27
5. (i) (c)   (ii) (b)
6. 2.76
7. 15
8. Number of cookies= 30,   Number of loaf= 20
9. 2.5 hours

CHAPTER 6 - LINES AND ANGLES

1. 40°

2. Angle between A and C=90° , Angle between C and F=30° , Angle between F and B = 60° Angle between B and D = 90° , Angle between D and E = 30° , Angle between E and A = 60°

3. x= 45°, z= 70°, y= 65° , t = 65°

4. Yes they are standing in a rectangle

   Justification:(By using angles sum property and concept of vertically opposite

5. Top angle = $\frac{1}{2}$ x 40° = 20°

   2nd angle = 70°

   Angle at folding point = 90°

CHAPTER 7 – TRIANGLES

1. 5
2. C
3. $\dfrac{1}{2}$
4. 360$^{\bullet}$
5. 9
6. 8cm
7. 432 square inches
8. B
9. 7.68 m
10. 20 m
11. 72.2 m

1.   a) PC = 14 cm,   AR = 12.5 cm
     b) $39.5\ cm$
2.   a) By joining mid pts. of sides of a quadrilateral
3.   a) D will send the team early $\angle ODC = 60° \ \& \ \angle OCD = 30°$
     $\Rightarrow OC > OC$ (side opp. to larger angle is longer)
     b) Serving people with honesty.
4. $30\ cm$

5. $\angle A = \angle C = 65°, \ \angle B = 115° = \angle D$

6.   Distribution is fair

     Justification:

$$BD = \sqrt{AD^2 - AB^2} = \sqrt{100 - 36} = \sqrt{64}$$

$$BD = 8\ cm$$

$$\text{ar}\ (ABD) = \frac{1}{2} \times 6 \times 8$$

$$= 24\ cm^2$$

     area (BCD)

$$S = \frac{a+b+c}{2} = \frac{5+5+8}{2} = 9\ cm$$

$$\text{area} = \ \sqrt{9 \times (9-5) \times (9-5) \times (9-8)}$$

$$= \sqrt{9 \times 4 \times 4 \times 1}$$

$$= 12\ cm^2$$

7.   a) Three

     b) Rectangle, parallelogram, kite

8.   a) Yes

     b) $\angle ADB = \angle DBC = y$ (alternate int. angles)

             since $BC < CD$ (angle opp. to smaller side is smaller)

$\therefore x < y$

9. Yes

10. a) By joining diagonals the rectangular part will be divided into two   equal parts. Area of each portion is 125m^2

    b). Yes it will cost more.

    c). $(160+500) \times 30 = Rs\ 1980$

11. a). 160m

    b) 2:1

    c). Rs 25600

CHAPTER 9 –AREAS OF PARALLELOGRAMS AND TRIANGLES

1. Rectangle. Because perimeter of rectangle is less than perimeter of parallelograms

3. 100 m^2

5. 12 cm^2

6. (i) From the given figure:

    The field $PQRS$ is divided into three parts,

    $\Delta PQRS, \Delta APS$ and ΔAQR.

    Now, ΔPAQ and $\|^{gm} PQRS$ are on the same

    base and lie between the same parallels.

    $\therefore ar(\Delta PAQ) = \frac{1}{2} ar (\|^{gm} PQRS)$

    and $ar(\Delta APS) + ar(\Delta AQR)$

    $= \frac{1}{2} ar(\|^{gm} PQRS)$

    He should build the home in portion ΔAPQ

    and should leave open ΔAPS and ΔAQR.

    (ii) We should respect our elders.

7. i) Let $ABCD$ be the plot and Naveen decided to donate some portion to construct a home for orphan girls from one corner say C of plot $ABCD$. Now, Naveen also purchases equal amount of land in lieu of land $CDO,$ so that he may have triangular form of plot. BD is joined. Draw a line through C parallel to DB to meet AB produced in P.
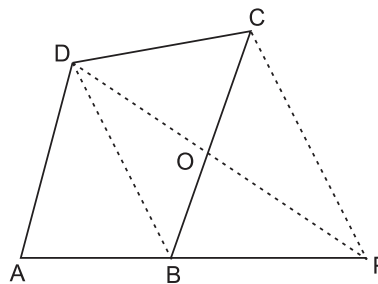
Join DP to intersect BC at O.

Now, ΔBCD and ΔBPD are on the same base

and between same parallels $CP \parallel DB$.

$\Rightarrow \quad ar(\Delta BCD) = ar(\Delta BPD)$

$\Rightarrow \quad ar(\Delta COD) + ar(\Delta DBO) = ar(\Delta BOP) + ar(\Delta DBO)$

$\Rightarrow \quad ar(\Delta COD) = ar(\Delta BOP)$

$\Rightarrow \quad ar(quad.\,ABCD)$

$\qquad = ar(quad.\,ABOD) + ar(\Delta COD)$

$\qquad = ar(quad.\,ABOD) + ar(\Delta BOP)$

$\qquad\qquad [\because ar(\Delta COD) = ar(\Delta BOP)\,]$

$\qquad\qquad\qquad [proved\ above]$

$\qquad = ar(\Delta APD)$

Hence, Naveen purchased the portion ΔBOP to meet his requirement.

(ii) Two triangles are on the same base and between same parallels are equal in area.

(iii) We should help the orphan children.

8. (i) Each child will get equal share of property.

(ii) Area of parallelogram and triangle and mid-point theorem.

(iii) Every child, boy girl have equal right, so avoid discrimination in boy and girl.

9. Median of a triangle divide the triangle into two triangles of equal area.

10. (Hint) Median of a triangle divide the triangle into two triangles of equal area

11. i) If a parallelogram and triangle are on the same base and between same parallels, then the area of triangle is equal to half the area of parallelogram.

ii) 450 m^2

iii) Unity, care for the health of its members and promotion of yoga and medicinal herbs

CHAPTER 10- CIRCLES

1. a) Perimeter
   b). Length of wire 47.14 *inches*
   c). Minimum length of square sheet $= 2\frac{1}{2} + 2\frac{1}{2} = 5$ inches.

2. i) 10 seconds to complete 1 rotation
   ⇨ In 8 hours, no. of rotations $\frac{8 \times 60 \times 60}{10}$
   $= \frac{28800}{10}$
   $= 2880$ rotations

   ii) Length of wheel in water $= 1/6$ of circumferences

   $\frac{1}{6} \times 2 \times \frac{22}{7} \times 12 = 12.56$ *feet*

3. i) $\angle PAQ = \angle PBQ = \angle PCQ = 52°$
   This means that the theatre has been designed in way that the viewing angle will remain the same irrespective of the seat taken up. So she can go for any of the seats near A or C.

   ii) Angles in the same arc of a circle are equal

4. 1. $\angle B1B3G1 = 40°$
   2. $\angle B1B2G1 = 40°$
   3. They are equal

5. 1. $\angle ACB = 65$ degree
   2. $\angle ADB = 65$ degree
   3. Yes

6. 1. $\angle 3 = 40$ degree
   2. $\angle 2 = 90$ degree
   3. $\angle 4 = 90$ degree
   4. 90 degree each

7. Let AS= SD=AD=2x

   Δ ASD is an equilateral Δ

   Perp. AM will pass through O

   Now , SM =1/2 SD= X(say) ⌞ because   from the centre to the chord bisects the chord.]

In rt. $\triangle ASM$

$AS^2 = AM^2 + SM^2$

$AM^2 = AS^2 - SM^2$

$= (2SM)^2 - SM^2$

$AM^2 = 3SM^2$

i.e $AM = \sqrt{3}x^2$

$AM = \sqrt{3}x$

OM=AM-OA

$OM = \sqrt{(3)}x - 20)m$

In $\triangle OSM$

$OS^2 = OM^2 + SM^2$

$X^2 = (20)^2 - ((\sqrt{(3)}x - 20)2$

$X^2 = 400 - 3x^2 + 400 - 40\sqrt{3}x$

$4x^2 - 40\sqrt{3}x = 0$

$4x(x - 10\sqrt{3}) = 0$

Either 4x=0 or $x - 10\sqrt{3} = 0$

X=0 or $x = 10\sqrt{3}$

Rejecting x=0. $X = 10\sqrt{3}$

$SM = 10\sqrt{3}$

$SD = 2 \times 10\sqrt{3}$

$SD = 20\sqrt{3}m$

b) Perimeter of $\triangle ASD = 3 \times 20\sqrt{3}m = 60\sqrt{3}m$ therefore Total length of barbed wire needed $= 3*60\sqrt{3} = 180\sqrt{3m}$

c) Area of $\triangle OSD = \frac{\sqrt{3}}{4}a^2$
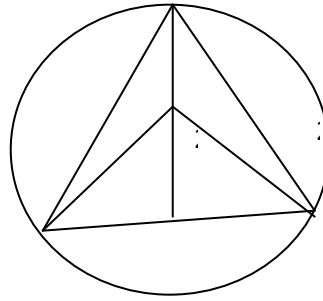
$$=\frac{\sqrt{3}}{4}(20\sqrt{3m})=300\sqrt{3}m^\wedge2$$

Profit earned $=300\frac{\sqrt{3}x\,20,000}{100}$ = Rs. 60,000$\sqrt{3}$

8. a)Draw AD ⊥ BC, Let OD=Y, AD=(5-Y) m, BD=X Centre O lies on the perpendicular bisector of BC.

Join OB,OC

In Rt- $\Delta OBD, \angle D=90^o$

$OB^2=BD^2+OD^2$

$25=x^2+y^2$ ------- **(1)**

In ΔABD, $AB^2=BD^2+AD^2$

$36=x^2+(5-Y)^2$ -------- **(2)**

Using 1 & 2
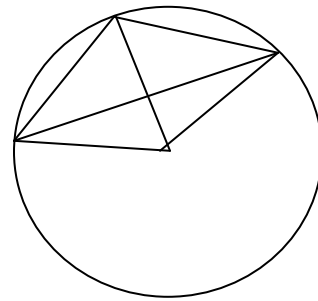
$36=25-y^2+(5-y)^2$

Y=7/5 m

Substituting y in eq 1, we get

X=4.8 m

BC=2*4.8

BC=9.6 m

b)Distance of the plank from the centre of the cross-section of the well=Y=7/5m

9. Radius of outer circle (R)= 250 m
Radius of inner circle (r)= (250 -3)=247 m

a) Area of Tracks = π (R^2-r^2)

$\qquad\qquad\qquad = 22/7\ (250^2 - 247^2)$

$\qquad\qquad\qquad = 22/7\ (250 - 247)(250 + 247)$

$\qquad\quad =\frac{22}{7}$ x 3 x 497 =

$$=22 \times 213 = 1696 \text{ m}^2$$

b) Distance between 2 consecutive lamp = circumference / 7

$$= \frac{\pi \, d}{7} = (22/7 \times 500) / 7 = 11000 / (7 \times 7) = 224.48 \text{ m}^2$$

c) Distance covered in 1 round = π d = 22/7 x 500

$$= \frac{11000}{7m} \text{ or 11/7 Km.}$$

11/7 Km. distance covered in 1 round.

1 Km. Distance covered in 7/11 round

100 calories burn in 1km=$\frac{7}{11}$ $rounds$

1100 calories burns in $\frac{7}{11 \; x \; 100}$ x 1100

11 calories burn in 7 rounds

1100 calories burn in 7rounds = 7 rounds

10. a) radius of cake=10+6=16cm

   area of top layer = πr

   $= 3.14 \times 16 \times 16$

   $= 803.84 \text{ cm}^2$

   10cm^2 area has 3gm cream.

   Therefore Total cream used in top layer= (803.84*3/10)g

   $= 241.152 \text{ g}$

   Cream in each slice=(241.152)/5=48.2304 g.

   Area of chocolate cream = π ($R^2 - r^2$)

   $=3.14(16^2 - 10^2)=3.14(16-10)(16+10)$

   $=3.14 \times 6 \times 26=489.84 \text{ cm}^2$

   No. of cherries =489.84/2=244.92

   No. Cherries=244

   Cream used in slice = 48.2304 g

   Therefore fat in each slice =12.0576g

11. Length of wall =200 m=20000cm

   Diameter of 1 circles= 80 cm

   Total circles= 20000/80=250

   Area of 1 circle =$\pi(40)^2$=5024cm^2

   Total area of 250 circle=(5024 *250)cm^2

Area covered by 1 ltr paint =80cm^2

Therefore Paint required for circles =5024*250/80=15700 ltrs.

Therefore cost of paint =15700 x 10= Rs.157000/-

b. Area of wall=20000*400=8000000 cm^2

   Area remaining after painting circles=8000000-1256000=6744000 cm^2

Therefore White paint required=6744000/80=84300 lt.

12. a) OL=OK + KL = 7+3=10 cm

OM= ON +NM = 7+3=10 cm

Area of right Δ OLM = 1/2 x OL X OM =1/2 X 10 X 10 = 50 cm^2

Area of quadrant OKN = 1/4 X π X (7)^2

= 1/4 x 22/7x 49 = 38.5 cm^2

Area of KLMN = 50- 38.5

= 11.5 cm^2

Cost @ 25 = 11.5 x 25x 30

For 30 momentos = Rs. 8625/

b) Area of circle = πr^2

= 22/7 x 49 = 154 cm^2

Area (not to be painted) = 154 – Area of OKN

= 115.5 cm^2 Ans

c) Ans. (b)

13.

a) OL ⊥ AD & BC

AL= LD = $\frac{1}{2}$ AD

BL= LC = $\frac{1}{2}$ BC

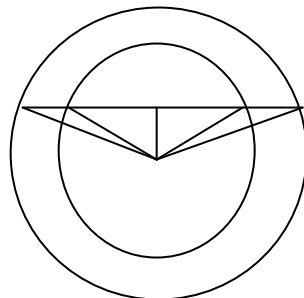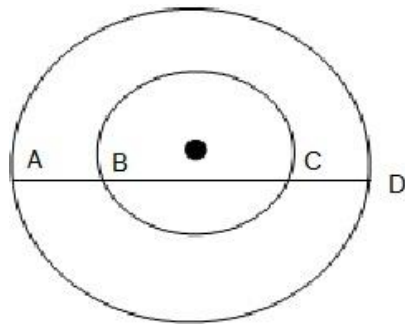(Because perpendicular from the center of a circle to a chord bisects the chord)

AB = AL – BL

= ½ AD – ½ BC

AB = ½ (AD – BC)

b) OC=10m

OD=15m

BC=16cm

LC=1/2BC=8m

In right angled $\Delta\ OLC$

OL= $\sqrt{10^2 - 8^2}$ = $\sqrt{36}$ = 6m

In right angled $\Delta\ OLD$

LD=$\sqrt{15^2 - 6^2}$ =$\sqrt{189}$ =13.75

Therefore CD = 13.75 - 8.0 = 5.75m   (app.)

14. a) . radius = $\sqrt{60^2 + 80^2}$ / 2

      = $\sqrt{3600 + 6400}$ /2

      = $\sqrt{10000}$ / 2

      = 100 / 2 cm = 50 cm

b)   Area left uncovered by the rectangular turf = Area circle- Area of rectangular turf

      = πr^2 – L x B

      = 3.14 x$(50)^2$ – (60)(80)

      =7850 – 4800

      = 3050 cm^2

15.

a) $\angle$BOC = 120^0

b)   Distance between two booths A & B is 20 $\sqrt{3}$ m

16. 1. radius of bangle is 3.5cm

    2. Volume is 2.07cm^3

17. a) 8 m

     b) 454 Sq. m (appr)

18. (a) Dist b/w Aakash, Devan & Prabha is 20$\sqrt{3}$ cm

    (b) Circles.

CHAPTER 12 - HERONS FORMULA

1. a) 16 m^2 b) 32m

   c) Total cost = 64 × 50 Rs = 3200Rs

   d) Area of ΔABC = 144 m^2

   e) Flags needed = perimeter/ 2

2. a) 84m^2

   b) 150m^2

   c) 257.07 m^2

d) As the area of circle is 491.07, therefore, sprinkler can water the whole land.

   e) Rs 19800

CHAPTER 13 –SURFACE AREA AND VOLUME

1. d) 10cm

2. The base of triangle is equal to diameter of 5 equal pots plus some extra space for corners. 20% means increase in one fifth more which allow one more pot to adjust. So number of pots becomes 21

   $6 + 5 + 4 + 3 + 2 + 1 = 21$

3. c) 12.5 litres

   5 Litres is $(100 – 20)/2 = 40\%$ of the aquarium volume

   $5 \times 100/40 = 12.5$ litres is 100%

4. E) normal spherical

   For a given surface area, the volume contained increases with increasing symmetry of the object. For instance, if we are to make water melons of different shapes of the same surface area, the volume will be maximum when it is made into a sphere. The corollary is that for a given volume, the surface area will be minimum when the object is a sphere. So, the customer should opt for spherical shaped water melons if she has to minimize wastage. For 2-dimensional object, for a given perimeter, the area increases with increasing symmetry. Among different triangles of a given perimeter, an equilateral triangle has the largest area. The area increases with increasing number of sides - i.e., for a given perimeter the area of a square will larger than that of an equilateral triangle; the area of a regular pentagon of a given perimeter will be larger than that of a square and so on. Among different regular polygons of a given perimeter / circumference a circle has the largest area.

5. **i)** Length $= 2\pi r$

   $= 2 \times 22/ 7 \times 7 = 44$cm

   Breadth $= h = 14$cm

   ii) Area of sheet needed $= 44 \times 14 = 616$ cm^2

   iii) Cost of 1 sheet $= 616 \times 0.75 = $ Rs. 462

   iv) Yes, she can buy one more sheet as cost of 2 sheets $= 462 \times 2 = $ Rs. 924

6. **c) 950** m^2

CHAPTER 14 – STATISTICS

1.   A. c
   B. d
   C. b
2. A. b
   B. d
   C. d
3. Rs 1450
4. median age = 32 years
   New median age = 35 years
5. Mean=78 km/h
   Median=76 km/h
6. median is 1
7. answer d
   Partial marks for option a

CHAPTER 15 – PROBABILITY

1. C
2. C
3. A
4. C
5. A
6. A
7. 1/9
8. 2/5
9. i) 12/24   ii) 4/24   iii) 2/24
10. i) 1/8   ii) 1/8

TURN YOUR OBSTACLES

INTO YOUR WAY TOWARDS SUCCESS
-ERIC WORRE