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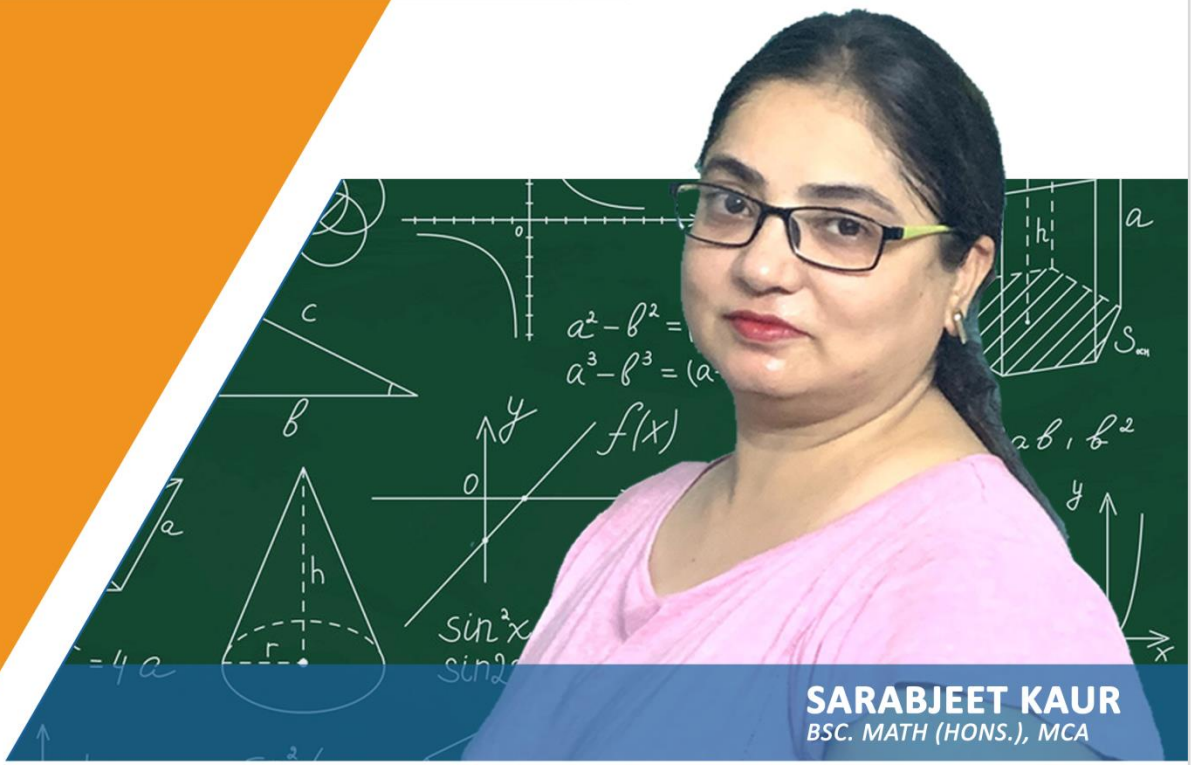

SARABJEET KAUR
BSC. MATH (HONS.), MCA

GRADE 9TH MATHS

CASE STUDIES

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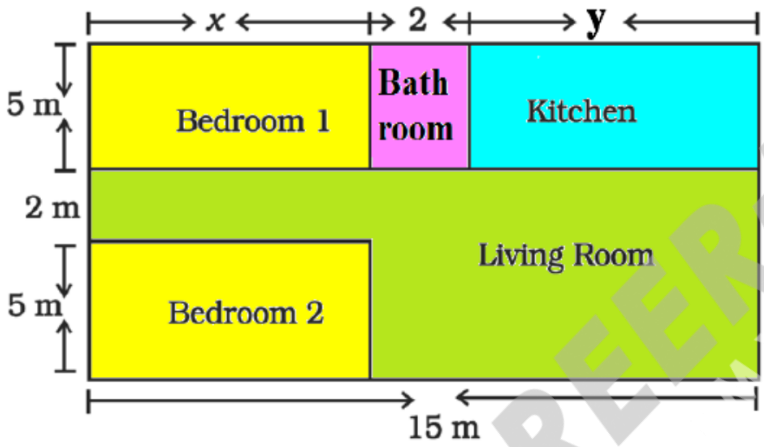
CASE STUDY QUESTION 01

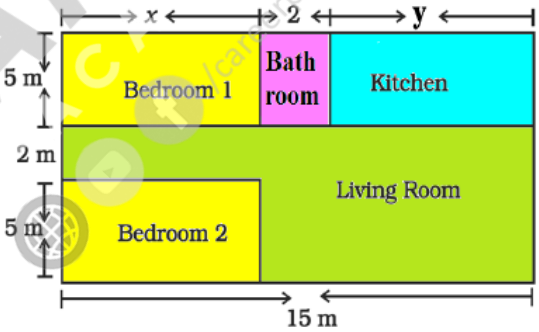
In the below given layout, the design and measurements has been made such that area of two bedrooms and Kitchen together is 95 sq. m.



(i) The area of two bedrooms and kitchen are respectively equal to

(a) $5x$, $5y$ (b) $10x$, $5y$

(c) $5x$, $10y$ (c) x, y



Area of one bedroom = $5x$ sq.m

Area of two bedrooms = $10x$ sq.m

Area of kitchen = $5y$ sq. m

(ii) Find the length of the outer boundary of the layout.

(a) 27 m (b) 15 m (c) 50 m (d) 54 m

Length of outer boundary = 12 + 15 + 12 + 15 = 54 m

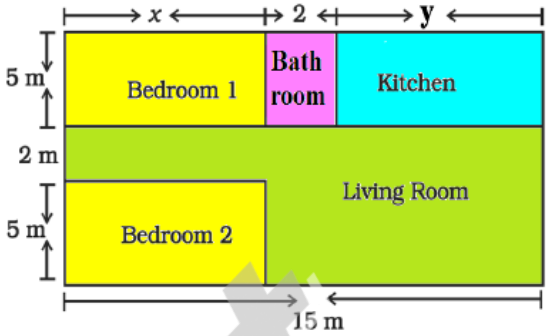
(iii) The pair of linear equation in two variables formed from the statements are

(a) $x + y = 13, x + y = 9$

(b) $2x + y = 13, x + y = 9$

(c) $x + y = 13, 2x + y = 9$

(d) None of the above



Area of two bedrooms = $10x$ sq.m

Area of kitchen = $5y$ sq. m

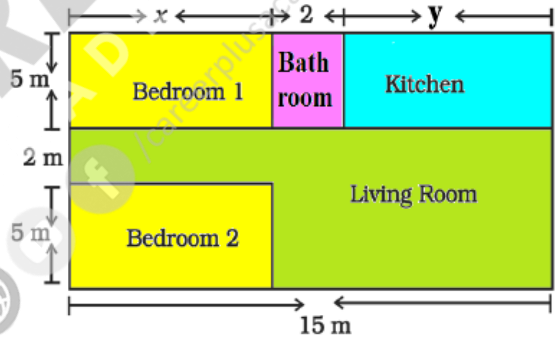
So, $10x + 5y = 95 \Rightarrow 2x + y = 19$

Also, $x + 2 + y = 15 \Rightarrow x + y = 13$

(iv) Which is the solution satisfying both the equations formed in (iii)?

(a) x = 7, y = 6 (b) x = 8, y = 5

(c) x = 6, y = 7 (d) x = 5, y = 8



x + y = 6 + 7 = 13

2x + y = 2(6) + 7 = 19

Ans: (c) x = 6, y = 7

(v) Find the area of each bedroom.

(a) 30 sq. m (b) 35 sq. m

(c) 65 sq. m (d) 42 sq. m

Area of living room = (15 x 7) – 30

= 105 – 30 =75 sq. m

CASE STUDY QUESTION 02

Deepak bought 3 notebooks and 2 pens for Rs. 80. His friend Ram said that price of each notebook could be Rs. 25. Then three notebooks would cost Rs.75, the two pens would cost Rs.5 and each pen could be for Rs. 2.50. Another friend Ajay felt that Rs. 2.50 for one pen was too little. It should be at least Rs. 16. Then the price of each notebook would also be Rs.16.

Lohith also bought the same types of notebooks and pens as Aditya. He paid 110 for 4 notebooks and 3 pens. Later, Deepak guess the cost of one pen is Rs. 10 and Lohith guess the cost of one notebook is Rs. 30.

(i) Form the pair of linear equations in two variables from this situation by taking cost of one notebook as Rs. x and cost of one pen as Rs. y.

(a) $3x + 2y = 80$ and $4x + 3y = 110$

(b) $2x + 3y = 80$ and $3x + 4y = 110$

(c) $x + y = 80$ and $x + y = 110$

(d) $3x + 2y = 110$ and $4x + 3y = 80$

Here, the cost of one notebook be Rs. x and that of pen be Rs. y.

According to the statement, we have

$3x + 2y = 80$ and

$4x + 3y = 110$

(ii) Which is the solution satisfying both the equations formed in (i)?

(a) x = 10, y = 20 (b) x = 20, y = 10

(c) x = 15, y = 15 (d) none of these

$3x + 2y = 3(20) + 2(10) = 60 + 20 = 80$

$4x + 3y = 4(20) + 3(10) = 80 + 30 = 110$

Ans: (b) x = 20, y = 10

(iii) Find the cost of one pen?

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

Cost of 1 pen = Rs. 10

Ans: (b) Rs. 10

(iv) Find the total cost if they will purchase the same type of 15 notebooks and 12 pens.

(a) Rs. 400 (b) Rs. 350 (c) Rs. 450 (d) Rs. 420

Total cost = Rs. 15 x 20 + Rs. 12 x 10
= 300 + 120
= Rs. 420

(v) Find whose estimation is correct in the given statement.

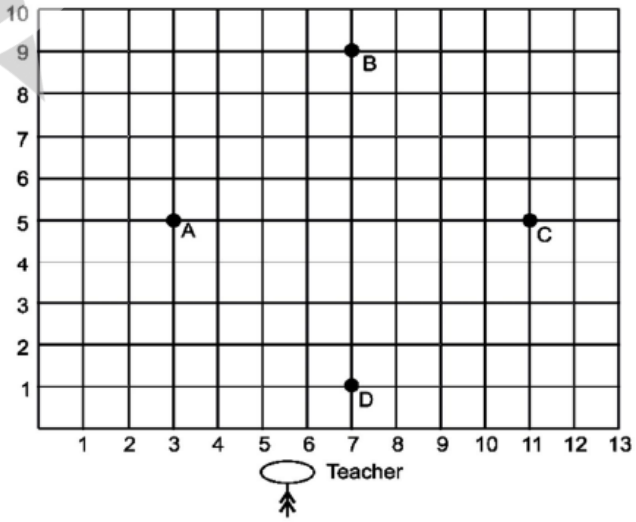
(a) Deepak (b) Lohith (c) Ram (d) Ajay

Ram said that price of each notebook could be Rs. 25.
Ajay felt that Rs. 2.50 for one pen was too little. It should be at least Rs. 16
Deepak guess the cost of one pen is Rs. 10 and
Lohith guess the cost of one notebook is Rs. 30

Therefore, estimation of Deepak is correct

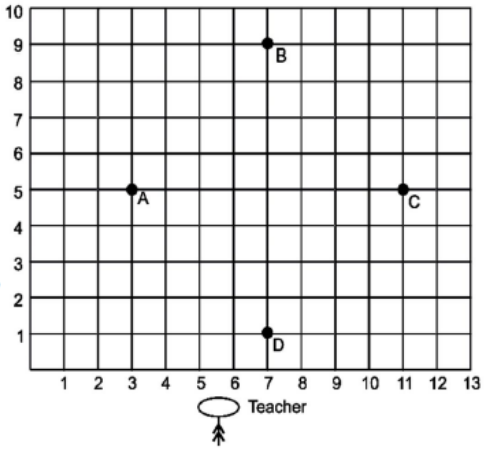
CASE STUDY QUESTION 03

Students of a school are standing in rows and columns in their playground for a drill practice. A, B, C and D are the positions of four students as shown in the figure.



(a) What are the coordinates of A and B respectively?
(i) A(3, 5); B(7, 8) (ii) A(5, 3); B(8, 7)
(iii) A(3, 5); B(7, 9) (iv) A(5, 3); B(9, 7)

Sol. (iii) A(3, 5); B(7, 9)

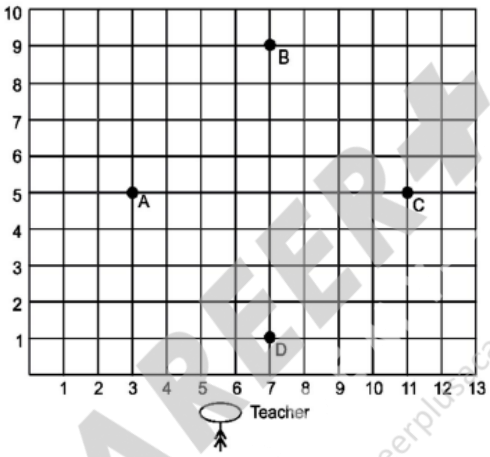


(b) What are the coordinates of C and D respectively?
(i) C(11, 5); D(7, 1) (ii) C(5, 11); D(1, 7)
(iii) C(5, 11); D(7, 1) (iv) C(5, 11); D(-1, 7)

Sol. (i) C(11, 5); D(7, 1)

(c) What is the distance between B and D?
(i) 5 units (ii) 14 units
(iii) 8 units (iv) 10 units

Sol. (iii) 8 units

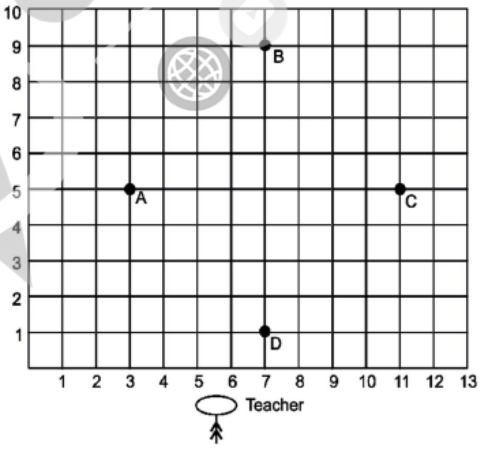


(d) What is the distance between A and C?
(i) 5 units (ii) 14 units
(iii) 8 units (iv) 10 units

Sol. (iii) 8 units

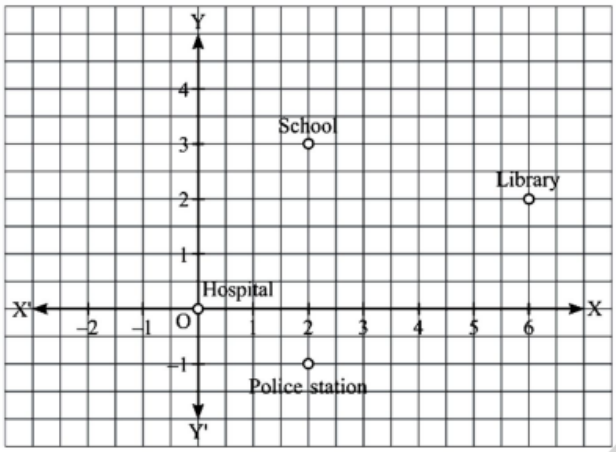
(e) What are the coordinates of the point of intersection of AC and BD?
(i) (7, 5) (ii) (5, 7)
(iii) (7, 7) (iv) (5, 5)

Sol. (i) (7, 5)



CASE STUDY QUESTION 04

Aditya is a Class IX student residing in a village. One day, he went to a city Hospital along with his grandfather for general checkup. From there he visited three places - School, Library and Police Station. After returning to his village, he plotted a graph by taking Hospital as origin and marked three places on the graph as per his direction of movement and distance. The graph is shown below:

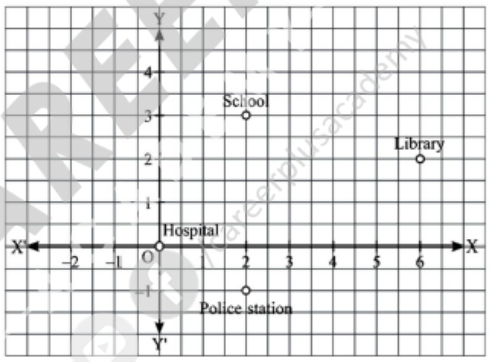


(i) What are the coordinates of School?

(a) (3, 2) (b) (2, 3)

(c) (3, 5) (d) (5, 3)

Sol. (b) (2, 3)



(ii) What are the coordinates of Police Station?

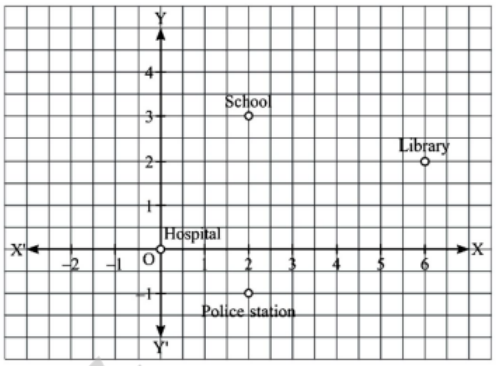
(a) (2, -1) (b) (2, 1)

(c) (-2, -1) (d) (-2, 1)

Sol. (a) (2, -1)

(iii) Distance between school and police station :
(a) 4 (b) 3 (c) 2 (d) 1

Sol. (a) 4

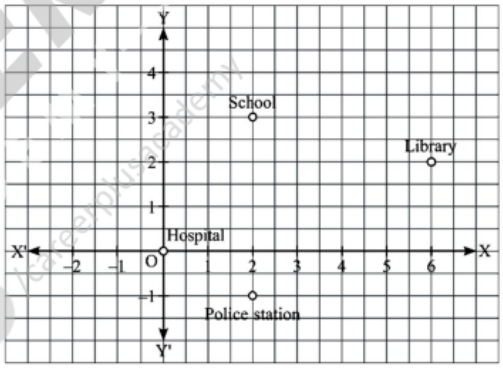


(iv) What are the coordinates of Library?
(a) (2, 6) (b) (2, -6)
(c) (6, -2) (d) (6, 2)

Sol. (d) (6, 2)

(v) In which quadrant the point (-1, 4) lies?
(a) I (b) II
(c) III (d) IV

Sol. (b) II



CASE STUDY QUESTION 05

Mathematics teacher of a school took her 9th standard students to show Red fort. It was a part of their Educational trip. The teacher had interest in history as well. She narrated the facts of Red fort to students. Then the teacher said in this monument one can find combination of solid figures. There are 2 pillars which are cylindrical in shape. Also 2 domes at the corners which are hemispherical.7 smaller domes at the centre. Flag hoisting ceremony on Independence Day takes place near these domes.

(i) How much cloth material will be required to cover 2 big domes each of radius 2.5 metres? (Take $\pi = 22/7$)

(a) 75 m^2 (b) 78.57 m^2 (c) 87.47 m^2 (d) 25.8 m^2

Radius of a dome, $r = 2.5$ cm

The dome is hemispherical in shape.

Then, cloth material required = 2 × Surface area of hemisphere

$= 2 \times 2\pi r^2$

$= 4 \times \frac{22}{7} \times 2.5 \times 2.5 = 78.57 \text{ m}^2$

Sol. (i) (b) 78.57 m^2

(ii) Write the formula to find the volume of a cylindrical pillar :

(a) $\pi r^2 h$ (b) πrl (c) $\pi r(l + r)$ (d) $2\pi r$

Sol. (ii) (a) $\pi r^2 h$

(iii) Find the lateral surface area of two pillars if height of the pillar is 7 m and radius of the base is 1.4 m.

(a) 112.3 cm^2 (b) 123.2 m^2 (c) 90 m^2 (d) 345.2 cm^2

Height of each pillar, $h = 7$ m

Radius of base, $r = 1.4$ m

Lateral surface area or curved surface area of 2 pillars = $2 \times 2\pi rh$

$= 4 \times \frac{22}{7} \times 1.4 \times 7$

$= 123.2 \text{ m}^2$

Sol. (iii) (b) 123.2 m^2

(iv) How much is the volume of a hemisphere if the radius of the base is 3.5 m?

(a) 85.9 m^3 (b) 80 m^3 (c) 98 m^3 (d) 89.83 m^3

Radius of hemisphere, $r = 3.5$ m

Then, volume of a hemisphere, $V = \frac{2}{3}\pi r^3$

$$= \frac{2}{3} \times \frac{22}{7} \times (3.5)^3$$

$$= 89.83 \text{ m}^3$$

Sol. (iv) (d) 89.83 m^3

(v) What is the ratio of sum of volumes of two hemispheres of radius 1 cm each to the volume of a sphere of radius 2 cm?

(a) 1 : 1 (b) 1 : 8 (c) 8 : 1 (d) 1 : 16

Volume of 2 hemispheres of radius 1 cm $= 2 \times \frac{2}{3}\pi r^3 = \frac{4}{3}\pi(1)^3 = \frac{4}{3}\pi \text{ cm}^3$

Volume of 1 sphere of radius 2 cm $= \frac{4}{3}\pi(r^3) = \frac{4}{3}\pi(2)^3 = \frac{32}{3}\pi \text{ cm}^3$

Then, required ratio $= \frac{\frac{4}{3}\pi}{\frac{32}{3}\pi} = \frac{1}{8}$

Sol. (v) (b) 1 : 8

CASE STUDY QUESTION 06

Mathematics teacher of a school took her 9th standard students to show Gol Gumbaz. It was a part of their Educational trip. The teacher had interest in history as well. She narrated the facts of Gol Gumbaz to students. Gol Gumbaz is the tomb of king Muhammad Adil Shah, Adil Shah Dynasty. Construction of the tomb, located in Vijayapura , Karnataka, India, was started in 1626 and completed in 1656. It reaches up to **51 meters** in height while the giant dome has an external diameter of **44 meters**, making it one of the largest domes ever built. At each of the four corners of the cube is a dome shaped octagonal tower seven stories high with a staircase inside.

(a) What is the total surface area of a cuboid?

(i) $lb + bh + hl$ (ii) $2(lb + bh + hl)$

(iii) $2(lb + bh)$ (iv) $l^2 + b^2 + h^2$

Ans: (ii) $2(lb + bh + hl)$

(b) What is the curved surface area of hemispherical dome ?

(i) 908π m^2 (ii) 968π m^2 (iii) 340π m^2 (iv) 780π m^2

Diameter = 44 m

Radius = 22 m

Curved surface area of hemispherical dome $= 2\pi r^2$

$= 2\pi(22)^2 = 968\pi$ m^2

Ans: (ii) 968π m^2

(c) What is the height of the cubodial part ?

(i) 14 m (ii) 7 m (iii) 29 m (iv) 18 m

Total height of monument = 51 m

Radius of hemispherical dome part

= height of hemispherical dome = 22 m

Height of the cuboidal part = 51 m – 22m = 29 m

Ans: (iii) 29 m

(d) What is the circumference of the base of the dome ?

(i) 34π (ii) 22π (iii) 44π (iv) 55π

Circumference of the base of the dome = $2\pi r$

$= 2\pi(22) = 44\pi$

Ans: (iii) 44π

(v) *The total surface area of a hemispherical dome having radius 7 cm is : (including base)*

(a) 462 cm^2 (b) 294 cm^2 (c) 588 cm^2 (d) 154 cm^2

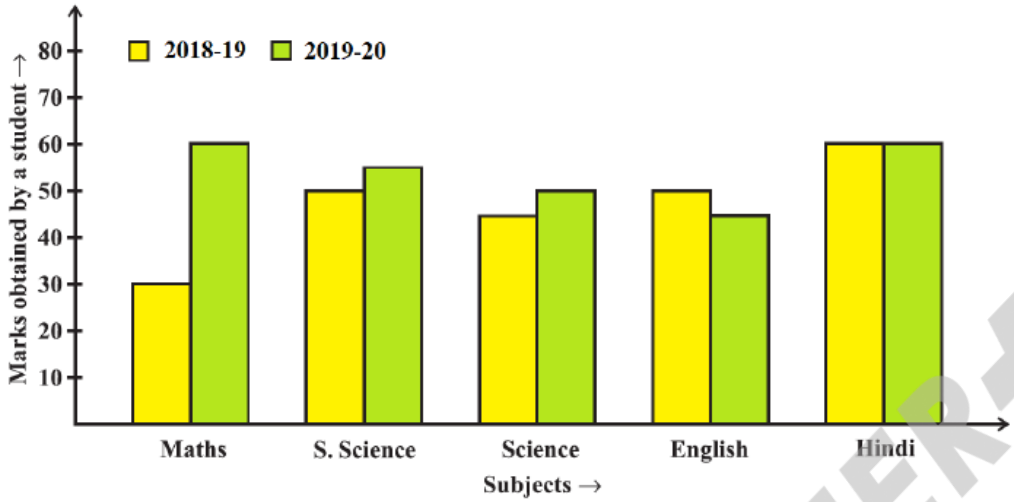
TSA of hemispherical dome = $3\pi r^2$

$= 3 \times \frac{22}{7} \times 7 \times 7$

$= 462\ cm^2$

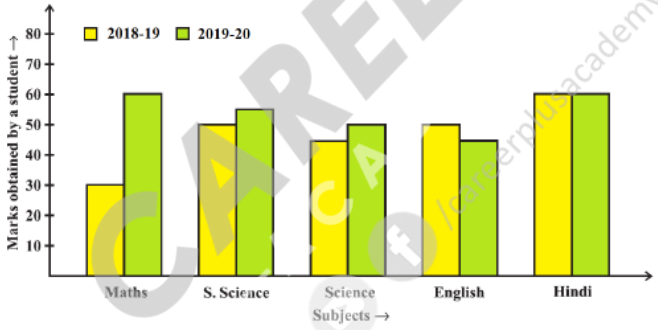
CASE STUDY QUESTION 07

The Class teacher of Class X preparing result analysis of a student. She compares the marks of a student obtained in Class IX (2018-19) and Class X (2019-20) using the double bar graph as shown below:



(i) In which subject has the performance improved the most?
(a) Maths (b) Social Science
(c) Science (d) English

Ans: (a) Maths



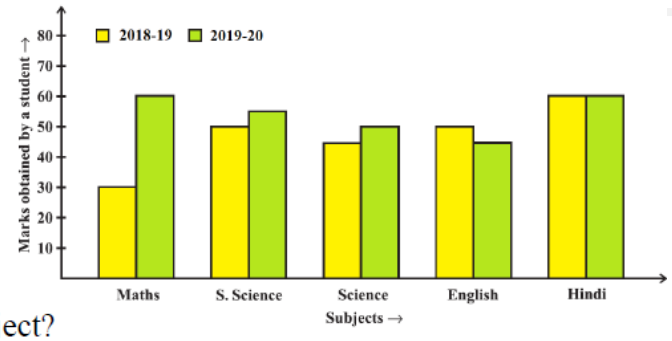
(ii) In which subject has the performance deteriorated?
(a) Maths (b) Social Science
(c) Science (d) English

Ans: (d) English

(iii) In which subject is the performance at par?

(a) Hindi (b) Maths

(c) Science (d) English



Ans: (a) Hindi

(iv) What is the difference in Maths Subject?

(a) 5 (b) 30 (c) 0 (d) 10

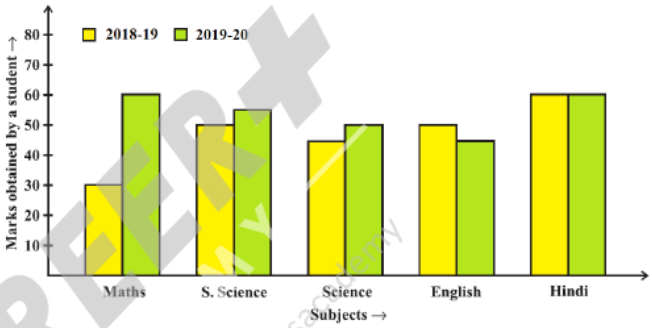
Difference = 60 – 30 = 30

Ans: (b) 30

(v) What is the percentage of marks obtained by a student in Class X (2019-20)?

(a) 60% (b) 55%

(c) 54% (d) 65%



Total marks = 60 + 55 + 50 + 45 + 60

= 270

Percentage = 270 x 100/500 = 54%

Ans: (c) 54%

CASE STUDY QUESTION 08

A Mathematics teacher asks students to collect the marks of Mathematics in Half yearly exam. She instructed to all the students to prepare frequency disctribution table using the data collected. Ram collected the following marks (out of 50) obtained in Mathematics by 60 students of Class IX

21, 10, 30, 22, 33, 5, 37, 12, 25, 42, 15, 39, 26, 32, 18, 27, 28, 19, 29, 35, 31, 24, 36, 18, 20, 38, 22, 44, 16, 24, 10, 27, 39, 28, 49, 29, 32, 23, 31, 21, 34, 22, 23, 36, 24, 36, 33, 47, 48, 50, 39, 20, 7, 16, 36, 45, 47, 30, 22, 17.

21, 10, 30, 22, 33, 5, 37, 12, 25, 42, 15, 39, 26, 32, 18, 27, 28, 19, 29, 35, 31, 24, 36, 18, 20, 38, 22, 44, 16, 24, 10, 27, 39, 28, 49, 29, 32, 23, 31, 21, 34, 22, 23, 36, 24, 36, 33, 47, 48, 50, 39, 20, 7, 16, 36, 45, 47, 30, 22, 17.

(i) How many students scored more than 20 but less than 30?
(a) 20 (b) 21 (c) 22 (d) 23

Ans: (b) 21

Groups	Tally Marks	Frequency
0-10	II	2
10-20	𝍸 𝍸	10
20-30	𝍸 𝍸 𝍸 𝍸 I	21
30-40	𝍸 𝍸 𝍸 IIII	19
40-50	𝍸 II	7
50-60	I	1
	Total	**60**

(ii) How many students scored less than 20 marks?
(a) 10 (b) 11 (c) 12 (d) 14

Ans: (c) 12

(iii) How many students scored more than 60% marks?
(a) 20 (b) 25 (c) 26 (d) 27

Groups	Tally Marks	Frequency
0-10	II	2
10-20	𝍸 𝍸	10
20-30	𝍸 𝍸 𝍸 𝍸 I	21
30-40	𝍸 𝍸 𝍸 IIII	19
40-50	𝍸 II	7
50-60	I	1
	Total	**60**

60% marks = 30 marks
No. of students more than 30 marks
= 19 + 7 + 1 = 27

Ans: (d) 27

(iv) What is the class size of the classes?
(a) 10 (b) 5 (c) 15 (d) 20

Ans: (a) 10

(v) What is the class mark of the class interval 30 – 40?
(a) 30 (b) 35 (c) 40 (d) 70

Class mark = Mean of lower limit and upper limit
= (30 + 40) / 2
= 70/2 = 35

Ans: (b) 35

CASE STUDY QUESTION 09

Prime Minister's National Relief Fund (also called PMNRF in short) is the fund raised to provide support for people affected by natural and man-made disasters. Natural disasters that are covered under this include flood, cyclone, earthquake etc. Man-made disasters that are included are major accidents, acid attacks, riots, etc.

Two friends Sita and Gita, together contributed Rs. 200 towards Prime Minister's Relief Fund. Answer the following :

(a) Which out of the following is not the linear equation in two variables ?

(i) $2x = 3$ (iii) $x^2 + x = 1$

(ii) $4 = 5x - 4y$ (iv) $x - \sqrt{2}y = 3$

Ans: (iii) $x^2 + x = 1$

(b) How to represent the above situation in linear equations in two variables ?

(i) $2x + y = 200$ (iii) $200x = y$

(ii) $x + y = 200$ (iv) $200 + x = y$

Here, x represents Sita's contribution and y represents Gita's contribution.

Ans: (ii) $x + y = 200$

(c) If Sita contributed Rs. 76, then how much was contributed by Gita ?

(i) Rs. 120 (iii) Rs. 124

(ii) Rs. 123 (iv) Rs. 125

If $x = 76$ then $76 + y = 200$

$y = 200 - 76$

$y = 124$

(d) If both contributed equally, then how much is contributed by each?

(i) Rs. 50, Rs. 150 (iii) Rs. 50, Rs. 50

(ii) Rs. 100, Rs. 100 (iv) Rs. 120, Rs. 120

If $x = y$ then $x + x = 200$

$2x = 200$

$x = 200/2 = 100$

(e) Which is the standard form of linear equations $x = -5$?

(i) $x + 5 = 0$ (ii) $1.x - 5 = 0$ (iii) $1.x + 0.y + 5 = 0$ (iv) $1.x + 0.y = 5$

Since, $x = -5 \Rightarrow x + 5 = 0$

Thus, standard form of $x = -5$ is $1.x + 0.y + 5 = 0$.

Ans: (iii) $1.x + 0.y + 5 = 0$

CASE STUDY QUESTION 10

Sanjay bought 5 notebooks and 2 pens for Rs. 120. He told to guess the cost of each notebook and pen to his friends Mohan and Anil. Sanjay has given the clue that both the costs are positive integers and divisible by 5 such that the cost of a notebook is greater than that of a pen.

Now, Mohan and Anil tried to guess.

Mohan said that price of each notebook could be Rs. 18. Then five notebooks would cost Rs.90, the two pens would cost Rs.30 and each pen could be for Rs. 15.

Anil felt that Rs. 18 for one notebook was too little. It should be at least Rs. 20. Then the price of each pen would also be Rs.10.

(i) Form the linear equations in two variables from this situation by taking cost of one notebook as Rs. x and cost of one pen as Rs. y.

(a) $2x + 5y = 120$ (b) $5x + y = 120$

(c) $x + y = 120$ (d) $5x + 2y = 120$

Here, the cost of one notebook be Rs. x and that of pen be Rs. y.

According to the statement, we have

$5x + 2y = 120$

(ii) Which is the solution of the equations formed in (i)?

(a) x = 10, y = 20 (b) x = 20, y = 10

(c) x = 15, y = 15 (d) none of these

$5x + 2y = 5(10) + 2(20) = 50 + 40 = 90 \neq 120$

$5x + 2y = 5(20) + 2(10) = 100 + 20 = 120$

$5x + 2y = 5(15) + 2(15) = 75 + 30 = 105 \neq 120$

Ans: (b) x = 20, y = 10

(c) If the cost of one notebook is Rs. 15 and cost of one pen is 10, then find the total amount.

(i) Rs. 120 (iii) Rs. 105
(ii) Rs. 95 (iv) Rs. 125

$5x + 2y = 5(15) + 2(10) = 75 + 20 = 95$

Ans: (c) Rs. 95

(d) If the cost of one notebook is twice the cost of one pen, then find the cost of one pen?

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

Here, $x = 2y$

$5(2y) + 2y$

$= 10y + 2y = 12y = 120$

$\Rightarrow y = 10$

Ans: (b) Rs. 10

(e) Which is the standard form of linear equations $y = 4$?

(i) $y - 4 = 0$ (ii) $1.y + 4 = 0$ (iii) $0.x + 1.y + 4 = 0$ (iv) $0.x + 1.y - 4 = 0$

Since, $y = 4 \Rightarrow y - 4 = 0$

Thus, standard form of $y = 4$ is $0.x + 1.y - 4 = 0$

Ans: (iv) $0.x + 1.y - 4 = 0$

CASE STUDY QUESTION 11

Mathematics teacher of a school took his 10th standard students to show Taj Mahal. It was a part of their Educational trip. The teacher had interest in history as well. He narrated the facts of Taj Mahal to the students. Then the teacher said in this monument one can find combination of solid figures. There are 4 pillars which are cylindrical in shape. Also, 2 domes at the back side which are hemispherical. 1 big domes at the centre. It is the finest example of the symmetry. (Use $\pi = 22/7$)

(i) How much cloth material will be required to cover 2 small domes each of radius 4.2 metres?

(a) 52.08 cm^2 (b) 52.8 m^2 (c) 52 m^2 (d) none of these

C.SA of 2 hemispheres $= 2 \times 2\pi r^2$

$$= 4 \times \frac{22}{7} \times \frac{42}{10} \times \frac{42}{10} = \frac{88 \times 252}{100}$$

$$= 221.76 \text{ m}^2$$

(ii) Write the formula to find the volume of one pillar (including hemispherical dome) :

(a) $\pi r^2(l + r)$ (b) $\pi r^2(2/3\ r + h)$ (c) $2\pi r^2 h$ (d) none of these

Volume of pillar = volume of cylinder + volume of hemisphere

$$= \pi r^2 h + \frac{2}{3}\pi r^3 = \pi r^2\left(h + \frac{2}{3}r\right)$$

(iii) The volume of the hemispherical dome at the centre if base radius is 7 m is :
(a) 718.66 cm^3 (b) 152.8 m^3 (c) 718.66 m^3 (d) 56 m^3

Volume of the hemispherical dome $= \frac{2}{3}\pi r^3$

$$= \frac{2}{3} \times \frac{22}{7} \times 7 \times 7 \times 7 = 718.66 \text{ m}^3$$

(iv) What is the lateral surface area of all 4 pillars if height of the each pillar is 14 m and base radius is 1.4 m (without dome)?
(a) 508 m^2 (b) 591.36 m^2 (c) 52 m^2 (d) none of these

Lateral surface area of 4 pillars $= 4 \times 2\pi rh$

$$= 4 \times 2 \times \frac{22}{7} \times 14 \times 14$$

$$= 591.36 \text{ m}^2$$

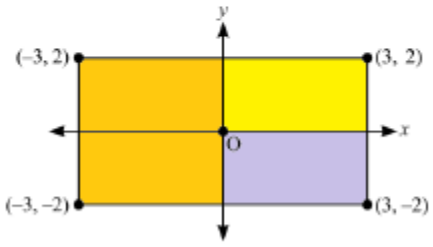
(v) The cost of polishing all the four pillars if the cost of 1 m^2 is Rs. 270, will be :
(a) Rs. 1,59,667.20 (b) Rs. 2,00,000
(c) Rs. 1,52,567.50 (d) none of these

The cost of polishing all the four pillars = 591.36 × ₹270

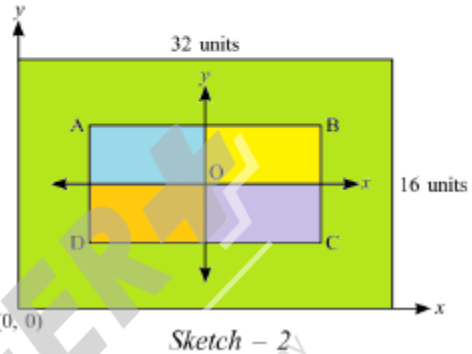
= ₹159,667.20

CASE STUDY QUESTION 12

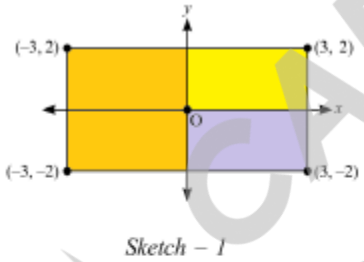
Kumar has a rectangular sketch, which he needs to draw on a coloured paper of length and breadth 32 units and 16 units respectively, using a plotter. Plotter is a device which is attached to a computer like a printer It is used for drawing complicated sketches. Plotter accepts only positive coordinates where the point (0, 0) is the left-bottom corner of the paper. The sketch ABCD needs to be centrally aligned on the paper.



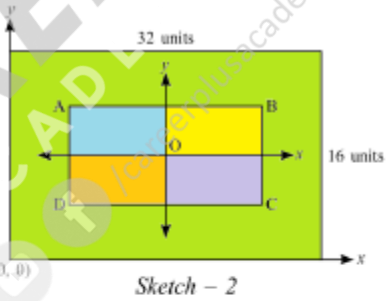
Sketch – 1



Sketch – 2



Sketch – 1



Sketch – 2

(a) What are the coordinates of A and B respectively?

(i) A(13, 10); B(19, 6) (ii) A(13, 10); B(19, 10)

(iii) A(19, 6); B(13, 10) (iv) A(19, 6); B(13, 6)

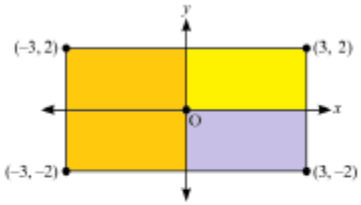
Sol. (ii) A(13, 10); B(19, 10)

(b) What are the coordinates of C and D respectively?

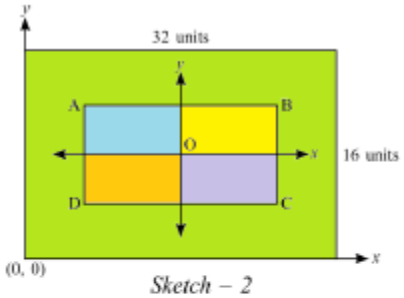
(i) A(13, 10); B(19, 6) (ii) A(13, 10); B(19, 10)

(iii) A(13, 10); B(13, 6) (iv) A(19, 6); B(13, 6)

Sol. (iv) A(19, 6); B(13, 6)



Sketch – 1



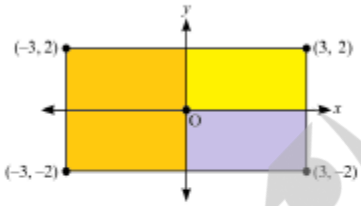
Sketch – 2

(c) The coordinates of point O in the sketch -2 is
(i) (0, 0) (ii) (16, 8) (iii) (8, 16) (iv) (16, 32)

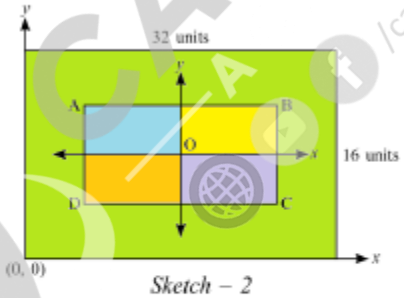
Sol. (ii) (16, 8)

(d) The point on the y-axis (in sketch 2) which is equidistant from the points B and C is
(i) (0, 8) (ii) (8, 0) (iii) (-8, 0) (iv) (0, -8)

Sol. (i) (0, 8)



Sketch – 1



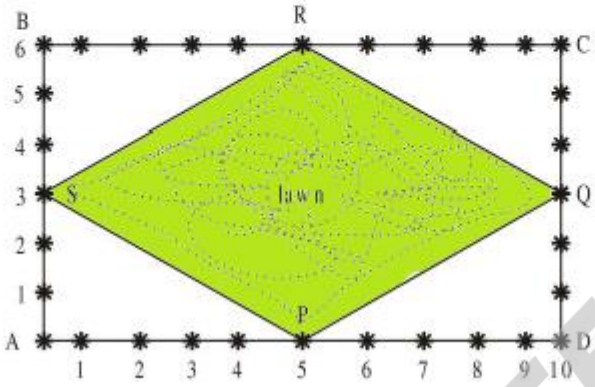
Sketch – 2

(e) The point on the x-axis (in sketch 2) which is equidistant from the points C and D is
(i) (0, -16) (ii) (16, 0) (iii) (-16, 0) (iv) (0, 16)

Sol. (ii) (16, 0)

CASE STUDY QUESTION 15

The Class IX students of a secondary school in Krishinagar have been allotted a rectangular plot of land for their gardening activity. Sapling of Gulmohar are planted on the boundary at a distance of 1m from each other. There is a lawn PQRS in the ground as shown in below figure.

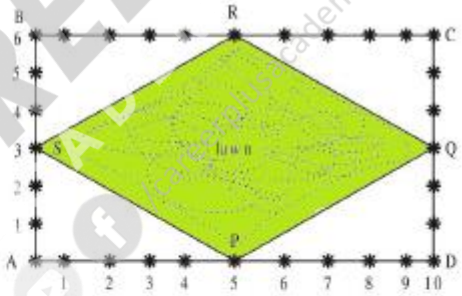


(a) What are the coordinates of C, taking A as origin?

(i) C(6, 10) (ii) C(10, 10)

(iii) C(6, 6) (iv) C(10, 6)

Sol. (iv) C(10, 6)



(b) What are the coordinates of R, taking A as origin?

(i) R(6, 5) (ii) R(5, 5)

(iii) R(5, 6) (iv) R(6, 6)

Sol. (iii) R(5, 6)

(c) Side of lawn is :

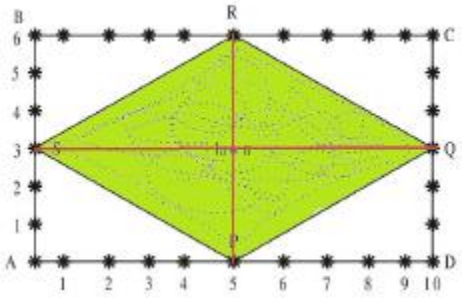
(i) 4 units (ii) $\sqrt{34}$ units (iii) 34 units (iv) None

$PS^2 = AS^2 + AP^2 = 5^2 + 3^2$

$= 25 + 9 = 34$

$\Rightarrow PS = \sqrt{34}$

Sol. (ii) $\sqrt{34}$



(d) Shape of lawn is :

(i) Rectangle (ii) Square

(iii) Parallelogram (iv) Rhombus

Sol. (iv) Rhombus

(e) Area of lawn is :

(i) 30 sq. units (ii) 60 sq. units

(iii) 45 sq. units (iv) None

Area of rhombus = ½ x product of diagonals

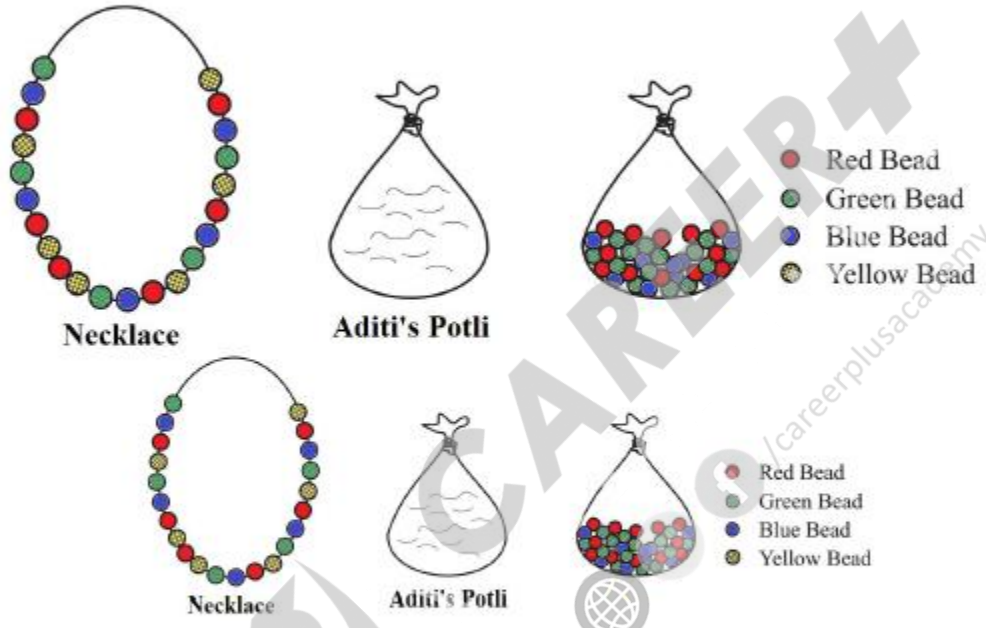
= ½ x 6 x 10

= 30 sq. units

Sol. (i) 30 sq. units

CASE STUDY QUESTION 16

Aditi runs a handicraft shop in Bapu bazar in Jaipur. She makes beautiful necklaces using colourful beads which she keeps in a potli. Today she prepared 19 necklaces but could not make the 20th necklace as she had no yellow beads left. She counted the beads and found that there were 8 red, 6 green and 14 blue beads remaining in her potli. Her little daughter Dulari requested for a bead. Aditi decides to take out one bead from her potli for Dulari.



(a) Find the probability that she draws a green bead.

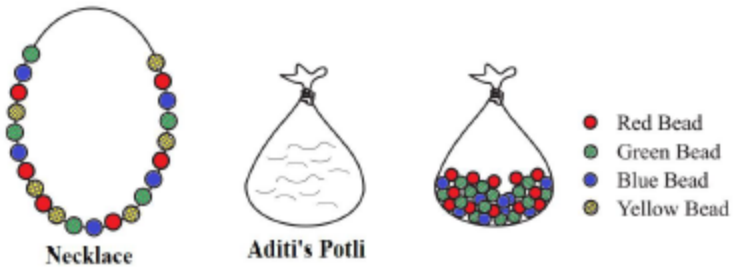
(i) 3/11 (ii) 3/7 (iii) 11/14 (iv) 3/14

Total number of beads in the Potli = 8 + 6 + 14 = 28
Number of green beads in the Potli = 6
Required probability = 6/28 = 3/14

(b) Find the probability that the bead drawn by her is not green.

(i) 3/11 (ii) 3/7 (iii) 11/14 (iv) 3/14

Number of beads not green in the Potli = 28 – 6 = 22
Required probability =22/28 = 11/14

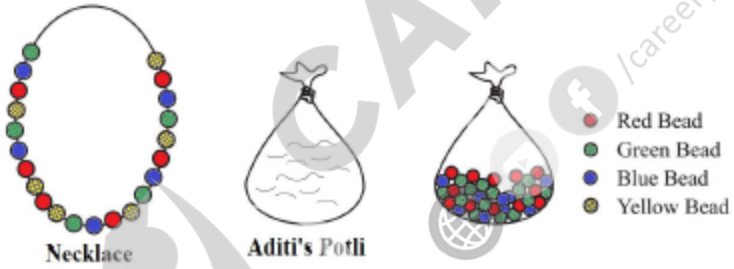


(c) Find the probability that she draws either a green or a blue bead.
(i) 5/7 (ii) 5/12 (iii) 7/12 (iv) 3/14

Number of blue and green beads in the Potli = 14 + 6 = 20
Required probability = 20/28 = 5/7

(d) Find the probability that she draws neither a red nor a green bead.
(i) 3/14 (ii) 1/3 (iii) 3/7 (iv) 1/2

Number of beads neither green nor red in the Potli =
Number of blue beads in the Potli = 14
Required probability =14/28 = 1/2

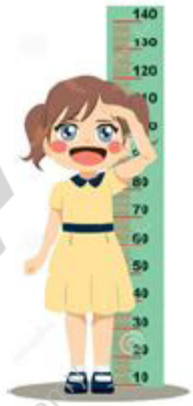


(e) Which of the following is an impossible event?
(i) The bead drawn is not red
(ii) The bead drawn is neither red nor blue
(iii) The bead drawn is either red or green or blue.
(iv) The bead drawn is yellow.

Ans: (iv) The bead drawn is yellow.

CASE STUDY QUESTION 18

A group of students decided to make a project on Statistics. They are collecting the heights (in cm) of their 51 girls of Class IX-A, B and C of their school. After collecting the data, they arranged the data in the following frequency distribution table form:



Height (in cm)	Number of girls
135 – 140	4
140 – 145	7
145 – 150	18
150 – 155	11
155 – 160	6
160 – 165	5

Based on the information, answer the following questions :

(a) The class interval with highest frequency is :

(i) 145-150 (ii) 150-155

(iii) 140-145 (iv) 155-160

Height (in cm)	Number of girls
135 – 140	4
140 – 145	7
145 – 150	18
150 – 155	11
155 – 160	6
160 – 165	5

Highest frequency is 18
which belongs to 145 – 150.

(b) What is the width of the class?

(i) 10 (ii) 15 (iii) 5 (iv) none of these

Answer: (iii) 5

Height (in cm)	Number of girls
135 – 140	4
140 – 145	7
145 – 150	18
150 – 155	11
155 – 160	6
160 – 165	5

(c) How many students of the height 150 cm and below are there?
(i) 40 (ii) 29
(iii) 18 (iv) 22

Ans: (ii) 29

(d) How many students of the height 145 cm and above are there?
(i) 40 (ii) 29 (iii) 18 (iv) 22

Ans: (i) 40

Height (in cm)	Number of girls
135 – 140	4
140 – 145	7
145 – 150	18
150 – 155	11
155 – 160	6
160 – 165	5

(e) How many students of the height more than 145 cm but less than 155 are there?
(i) 40 (ii) 29
(iii) 18 (iv) 22

Ans: (ii) 29

CASE STUDY QUESTION 19

One day, during games period four friends A, B, C and D planned to play game using number cards. They prepared 20 numbered cards with labelled 1 to 20 and then they put all the number cards in the empty chalk box available in the classroom. In this game, every friend was asked to pick the card randomly and after each draw, card was replaced back in the chalk box.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

(i) Find the probability, first boy pick the card and he get the card with an even number?

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{1}{6}$ (d) $\frac{3}{8}$

Number of possible outcomes = 20

Number of favourable outcomes = {2, 4, 6, 8, 10, 12, 14, 16, 18, 20} *i.e.*, 10

$\therefore$ P(even number) = $\frac{10}{20} = \frac{1}{2}$

(ii) If the card drawn in first case is replaced, and the second boy draws a card. What is the probability getting a prime number?

(a) $\frac{2}{5}$ (b) $\frac{4}{5}$ (c) $\frac{7}{8}$ (d) $\frac{9}{11}$

$\therefore$ Number of favourable outcomes = {2, 3, 5, 7, 11, 13, 17, 19} *i.e.*, 8

$\therefore$ P(prime number) = $\frac{8}{20} = \frac{2}{5}$

(iii) If the card drawn, is not replaced in the second draw, what is the probability that he got a multiple of 3 greater than 4?

(a) $\frac{1}{11}$ (b) $\frac{7}{20}$ (c) $\frac{6}{19}$ (d) $\frac{5}{19}$

Number of possible outcomes $= 20 - 1 = 19$

Favourable outcomes $= \{6, 9, 12, 15, 18\}$ *i.e.*, 5

$\therefore$ P(multiple of 3 greater than 4) $= \frac{5}{19}$

(iv) For a sure event A, P(A) = ?

(a) 1 (b) 0 (c) -1 (d) 2

(a) 1

(v) If all cards drawn are replaced then what is the probability of getting a multiple of 3 and 5?

(a) $\frac{1}{2}$ (b) $\frac{1}{5}$ (c) $\frac{1}{20}$ (d) $\frac{1}{18}$

Number of possible outcomes = 20

Favourable cases = {15} *i.e.*, 1

P(multiple of 3 and 5) $= \frac{1}{20}$