

Time: 2 Hours

MARCH – 2023

[Max. Marks: 40]

- Note:** i) All questions are compulsory.
ii) Use of a calculator is not allowed.
iii) The numbers of the right of the questions indicates full marks.
iv) In case of MCQs (Q.1.(A)), only the first attempt will be evaluated and will be given credit.
v) For every MCQ, the correct alternative (A), (B), (C) or (D) with sub question number is to be written as an answer.

Q.1. (A) Choose the *correct* answer and write the alphabet of it in front of the sub-question number. [4]

- (1) To draw the graph of $4x + 5y = 19$, find y when $x = 1$:
(a) 4 (b) 3 (c) 2 (d) -3
- (2) Out of the following equations which one is not a quadratic equation?
(a) $x^2 + 4x = 11 + x^2$ (b) $x^2 = 4x$
(c) $5x^2 = 90$ (d) $2x - x^2 = x^2 + 5$
- (3) For the given A.P. $a = 3.5$, $d = 0$, then $t_n = \dots$
(a) 0 (b) 3.5 (c) 103.5 (d) 104.5
- (4) If $n(A) = 2$, $P(A) = \frac{1}{5}$, then $n(S) = ?$
(a) 10 (b) $\frac{5}{2}$ (c) $\frac{2}{5}$ (d) $\frac{1}{3}$

Q.1. (B) Solve the following sub-questions. [4]

- (1) Find the value of the following determinant:
$$\begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix}$$
- (2) Find the common difference of the following A.P.:
2, 4, 6, 8,
- (3) On certain article if rate of CGST is 9%, then what is the rate of SGST?
- (4) If one coin is tossed, write the sample space 'S'.

Q.2. (A) Complete any two given activities and rewrite them. [4]

- (1) Complete the following activity; find the value of
- x
- :

$$5x + 3y = 9 \dots\dots\dots (I)$$

$$2x - 3y = 12 \dots\dots\dots (II)$$

Add equations (I) and (II)

$$\begin{array}{r}
 5x + 3y = 9 \\
 + \quad 2x - 3y = 12 \\
 \hline
 7x = \boxed{}
 \end{array}$$

$$\therefore x = \boxed{}$$

$$\therefore x = \boxed{}$$

- (2) Complete the following activity to determine the nature of the roots of the quadratic equation
- $x^2 + 2x - 9 = 0$
- .

Solution:Compare $x^2 + 2x - 9 = 0$ with $ax^2 + bx + c = 0$

$$a = 1, b = 2, c = \boxed{}$$

$$\therefore b^2 - 4ac = (2)^2 - 4 \times \boxed{} \times \boxed{}$$

$$\Delta = 4 + \boxed{} = 40$$

$$\therefore b^2 - 4ac > 0$$

 $\therefore$ The roots of the equation are real and unequal.

- (3) Complete the following table using given information:

Sr. No.	FV	Share is at	MV
1.	₹100	Par	
2.		Premium ₹500	₹575
3.	₹10		₹5
4.	₹200	Discount ₹50	

Q.2. (B) Solve the following sub-questions. (Any four) [8]

- (1) Solve the following simultaneous equations:

$$x + y = 4, 2x - y = 2$$

- (2) Write the following equation in the form
- $ax^2 + bx + c = 0$
- , then write the values of
- a, b, c
- :

$$2y = 10 - y^2$$

- (3) Write an A.P. whose first term is
- $a = 10$
- and common difference
- $d = 5$
- .

- (4) Courier service agent charged total ₹590 to courier a parcel from Nashik to Nagpur. In the tax invoice, taxable value is ₹500 on which CGST is ₹45 and SGST is ₹45. Find the rate of GST charged for this service.

- (5) Observe the following table and find mean:

Class	Class mark x_i	$d_i = x_i - A$ $d_i = x_i - 300$	Frequency f_i	Frequency $\times$ Deviation $f_i d_i$
200–240	220	–80	5	–400
240–280	260	–40	10	–400
280–320	300 $\rightarrow A$	0	15	0
320–360	340	40	12	480
360–400	380	80	8	640
Total			$\sum f_i = 50$	$\sum f_i d_i = 320$

Q.3. (A) Complete any *one* activity and rewrite it. [3]

- (1) Form a 'Road Safety Committee' of two, from 2 boys (B_1, B_2) and 2 girls (G_1, G_2).

Complete the following activity to write the sample space:

- (a) Committee of 2 boys = {, }
 (b) Committee of 2 girls = {, }
 (c) Committee of one boy and one girl
 = {, , , }

- (d) $\therefore$ Sample space (S) =
 {(B_1, B_2), (B_1, G_1), , , (B_2, G_2), (G_1, G_2)}

- (2) Fill in the boxes with the help of given information:

Tax invoice of services provided (Sample)								
Food Junction, Khed-Shivapur, Pune						Invoice No. 58		
Mob. No. 7588580000, email-ahar.khed@yahoo.com								
GSTIN: 27AAAAA5555B1ZA						Invoice Date 25 Feb, 2020		
SAC	Food Items	Qty	Rate (in ₹)	Taxable amount	CGST		SGST	
9963	Coffee	1	20	20.00	2.5%	₹ 0.50	2.5%	
9963	Masala Tea	1	10	10.00		₹ 0.25	2.5%	
9963	Masala Dosa	2	60		2.5%		2.5%	₹ 3.00
			Total	150.00				₹ 3.75
Grand Total							= ₹ 157.50	

Q.3. (B) Solve the following sub-questions. (Any two) [6]

- (1) Solve the following simultaneous equations using Cramer's rule:

$$4m + 6n = 54; 3m + 2n = 28$$

- (2) Solve the following quadratic equation by formula method:

$$x^2 + 10x + 2 = 0$$

- (3) A two digit number is formed with digits 2, 3, 5, 7, 9 without repetition. What is the probability of the following events?

Event A: The number formed is an odd number.

Event B: The number formed is a multiple of 5.

- (4) The frequency distribution table shows the number of mango trees in a grove and their yield of mangoes. Find the median of data:

No. of Mangoes	No. of Trees
50–100	33
100–150	30
150–200	90
200–250	80
250–300	17

Q.4. Solve the following sub-questions. (Any two) [8]

- (1) If the first term of A.P. is p , second term is q and last term is r , then show that sum of all terms is $(q + r - 2p) \times \frac{(p + r)}{2(q - p)}$.
- (2) Show the following data by a frequency polygon:

Electricity bill (₹)	Families
200–400	240
400–600	300
600–800	450
800–1000	350
1000–1200	160

- (3) The sum of the squares of five consecutive natural numbers is 1455. Find the numbers.

Q.5. Solve the following sub-questions. (Any one) [3]

- (1) Draw the graph of the equation $x + 2y = 4$. Find the area of the triangle formed by the line intersecting the X-axis and Y-axis.
- (2) A survey was conducted for 180 people in a city. 70 ate pizza, 60 ate burgers and 50 ate chips. Draw a pie diagram for the given information.

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Q.1. (A) Choose the *correct* answer and write the alphabet of it in front of the sub-question number. [4]

- (1) To draw the graph of $4x + 5y = 19$, find y when $x = 1$:
(a) 4 (b) 3 (c) 2 (d) -3 [1]
- (2) Out of the following equations which one is not a quadratic equation?
(a) $x^2 + 4x = 11 + x^2$ (b) $x^2 = 4x$
(c) $5x^2 = 90$ (d) $2x - x^2 = x^2 + 5$ [1]
- (3) For the given A.P. $a = 3.5$, $d = 0$, then $t_n = \dots\dots$
(a) 0 (b) 3.5 (c) 103.5 (d) 104.5 [1]
- (4) If $n(A) = 2$, $P(A) = \frac{1}{5}$, then $n(S) = ?$
(a) 10 (b) $\frac{5}{2}$ (c) $\frac{2}{5}$ (d) $\frac{1}{3}$ [1]

Ans. (1) – (b), (2) – (a), (3) – (b), (4) – (a)

Q.1. (B) Solve the following sub-questions. [4]

- (1) Find the value of the following determinant:

$$\begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix}$$

Solution:

$$\begin{aligned} \begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix} &= 4 \times 7 - 3 \times 2 && [1/2] \\ &= 28 - 6 \\ &= 22 && [1/2] [1] \end{aligned}$$

Ans. 22

- (2) Find the common difference of the following A.P.:

2, 4, 6, 8,

Solution:

Given A.P.: 2, 4, 6, 8, [1/2]

$$\therefore t_1 = 2, t_2 = 4, t_3 = 6, t_4 = 8$$

$$d = t_2 - t_1 = 4 - 2 = 2$$

$$d = t_3 - t_2 = 6 - 4 = 2$$

$$d = t_4 - t_3 = 8 - 6 = 2 \quad [1/2] [1]$$

Ans. The common difference is 2.

- (3) On certain article if rate of CGST is 9%, then what is the rate of SGST?

Solution:

$$\text{CGST} = \text{SGST}$$

Ans. $\therefore$ If CGST = 9%, then SGST = 9% [1]

- (4) If one coin is tossed, write the sample space 'S'.

Solution:

One coin is tossed.

Ans. $\therefore S = \{H, T\}$ [1]

Q.2. (A) Complete any two given activities and rewrite them. [4]

- (1) Complete the following activity; find the value of x :

Solution:

$$5x + 3y = 9 \text{ (I)}$$

$$2x - 3y = 12 \text{ (II)}$$

Add equations (I) and (II)

$$\begin{array}{rcl} 5x + 3y & = & 9 \\ + & 2x - 3y & = 12 \\ \hline 7x & = & 21 \end{array} \quad [1/2]$$

$$\therefore x = \frac{21}{7} \quad [1/2]$$

$$\therefore x = 3 \quad [1/2] [2]$$

- (2) Complete the following activity to determine the nature of the roots of the quadratic equation $x^2 + 2x - 9 = 0$.

Solution:

Compare $x^2 + 2x - 9 = 0$ with $ax^2 + bx + c = 0$

$$a = 1, b = 2, c = -9 \quad [1/2]$$

$$\therefore b^2 - 4ac = (2)^2 - 4 \times 1 \times -9 \quad [1]$$

$$\Delta = 4 + 36 = 40 \quad [1/2] [2]$$

$$\therefore b^2 - 4ac > 0$$

$\therefore$ The roots of the equation are real and unequal.

(3) Complete the following table using given information:

Sr. No.	FV	Share is at	MV	
1.	₹100	Par	₹100	[1/2]
2.	₹75	Premium ₹500	₹575	[1/2]
3.	₹10	Discount ₹5	₹5	[1/2]
4.	₹200	Discount ₹50	₹150	[1/2] [2]

Q.2. (B) Solve the following sub-questions. (Any four) [8]

(1) Solve the following simultaneous equations:

$$x + y = 4, 2x - y = 2$$

Solution:

Add equations (I) and (II): [1/2]

$$x + y = 4 \quad \dots(I)$$

$$2x - y = 2 \quad \dots(II)$$

$$\hline 3x = 6$$

$$\therefore x = \frac{6}{3}$$

$$\therefore x = 2 \quad [1/2]$$

Substituting $x = 2$ in equation (I),

$$2 + y = 4 \quad [1/2]$$

$$\therefore y = 4 - 2$$

$$\therefore y = 2 \quad [1/2] [2]$$

Ans. (2, 2) is the solution of the given equations.

(2) Write the following equation in the form $ax^2 + bx + c = 0$, then write the values of a, b, c :

$$2y = 10 - y^2$$

Solution:

$$2y = 10 - y^2$$

$$\therefore y^2 + 2y - 10 = 0$$

$$\text{Comparing with } ax^2 + bx + c = 0, \quad [1/2]$$

$$\text{Ans. } a = 1, \quad b = 2, \quad c = -10 \quad [1\frac{1}{2}] [2]$$

- (3) Write an A.P. whose first term is $a = 10$ and common difference $d = 5$.

Solution:

$$a = 10 \text{ and } d = 5 \text{ (given)}$$

$$\text{Now, } t_1 = a = 10 \quad [1/2]$$

$$t_2 = t_1 + d = 10 + 5 = 15 \quad [1/2]$$

$$t_3 = t_2 + d = 15 + 5 = 20$$

$$t_4 = t_3 + d = 20 + 5 = 25 \quad [1/2]$$

Ans. The required A.P. is 10, 15, 20, 25, [1/2] [2]

- (4) Courier service agent charged total ₹590 to courier a parcel from Nashik to Nagpur. In the tax invoice, taxable value is ₹500 on which CGST is ₹45 and SGST is ₹45. Find the rate of GST charged for this service.

Solution:

$$\text{Taxable value} = ₹500, \text{CGST} = \text{SGST} = ₹45$$

$$\text{GST} = \text{CGST} + \text{SGST} \quad [1/2]$$

$$= 45 + 45$$

$$= ₹90 \quad [1/2]$$

$$\text{Rate of GST} = \frac{90}{500} \times 100 \quad [1/2]$$

$$= 18\%$$

Ans. The rate of GST charged for this service is 18%. [1/2] [2]

- (5) Observe the following table and find mean:

Assumed mean $A = 300$

Class	Class mark x_i	$d_i = x_i - A$ $d_i = x_i - 300$	Frequency f_i	Frequency $\times$ Deviation $f_i d_i$
200–240	220	–80	5	–400
240–280	260	–40	10	–400
280–320	300 $\rightarrow A$	0	15	0
320–360	340	40	12	480
360–400	380	80	8	640
Total			$\Sigma f_i = 50$	$\Sigma f_i d_i = 320$

Solution:

$$A = 300, \sum f_i = 50, \sum f_i d_i = 320$$

$$\bar{d} = \frac{\sum f_i d_i}{\sum f_i} = \frac{320}{50} \quad [1/2]$$

$$= 6.4 \quad [1/2]$$

$$\text{Mean} = A + \bar{d} \quad [1/2]$$

$$= 300 + 6.4$$

$$\text{Ans.} = 306.4 \quad [1/2] [2]$$

Q.3. (A) Complete any *one* activity and rewrite it. [3]

- (1) Form a 'Road Safety Committee' of two, from 2 boys (B_1, B_2) and 2 girls (G_1, G_2).

Complete the following activity to write the sample space:

(a) Committee of 2 boys = $\{\boxed{B_1, B_2}\}$ [1/2]

(b) Committee of 2 girls = $\{\boxed{G_1, G_2}\}$ [1/2]

(c) Committee of one boy and one girl
= $\{\boxed{B_1, G_1}, \boxed{B_1, G_2}, \boxed{B_2, G_1}, \boxed{B_2, G_2}\}$ [1]

(d) $\therefore$ Sample space (S) =
 $\{(B_1, B_2), (B_1, G_1), \boxed{B_1, G_2}, \boxed{B_2, G_1}, (B_2, G_2), (G_1, G_2)\}$
[1] [3]

- (2) Fill in the boxes with the help of given information:

Tax invoice of services provided (Sample)								
Food Junction, Khed-Shivapur, Pune						Invoice No. 58		
Mob. No. 7588580000, email-ahar.khed@yahoo.com								
GSTIN: 27AAAAA5555B1ZA						Invoice Date 25 Feb, 2020		
SAC	Food Items	Qty	Rate (in ₹)	Taxable amount	CGST		SGST	
9963	Coffee	1	20	₹ 20.00	2.5%	₹ 0.50	2.5%	₹ 0.50
9963	Masala Tea	1	10	₹ 10.00	2.5%	₹ 0.25	2.5%	₹ 0.25
9963	Masala Dosa	2	60	₹ 120	2.5%	₹ 3	2.5%	₹ 3.00
			Total	₹ 150.00		₹ 3.75		₹ 3.75
Grand Total							= ₹ 157.50	

Note: 1/2 mark for each box.

[3]

Q.3. (B) Solve the following sub-questions. (Any two) [6]

(1) Solve the following simultaneous equations using Cramer's rule:

$$4m + 6n = 54; 3m + 2n = 28$$

Solution:

$$4m + 6n = 54; 3m + 2n = 28$$

$$D = \begin{vmatrix} 4 & 6 \\ 3 & 2 \end{vmatrix} = 4 \times 2 - 6 \times 3$$

$$= 8 - 18$$

$$= -10$$

[1/2]

$$D_m = \begin{vmatrix} 54 & 6 \\ 28 & 2 \end{vmatrix} = 54 \times 2 - 6 \times 28$$

$$= 108 - 168$$

$$= -60$$

[1/2]

$$D_n = \begin{vmatrix} 4 & 54 \\ 3 & 28 \end{vmatrix} = 4 \times 28 - 54 \times 3$$

$$= 112 - 162$$

$$= -50 \quad [1/2]$$

By Cramer's rule,

$$m = \frac{D_m}{D} = \frac{-60}{-10} = 6 \quad [1/2]$$

$$n = \frac{D_n}{D} = \frac{-50}{-10} = 5 \quad [1/2]$$

Ans. $\therefore$ (6, 5) is the solution of the given equations. $[1/2] [3]$

(2) Solve the following quadratic equation by formula method:

$$x^2 + 10x + 2 = 0$$

Solution:

$$x^2 + 10x + 2 = 0$$

Comparing with $ax^2 + bx + c = 0$,

$$a = 1, b = 10, c = 2 \quad [1/2]$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad [1/2]$$

$$\therefore x = \frac{-10 \pm \sqrt{(10)^2 - 4 \times 1 \times 2}}{2 \times 1} \quad [1/2]$$

$$= \frac{-10 \pm \sqrt{100 - 8}}{2}$$

$$= \frac{-10 \pm \sqrt{92}}{2} \quad [1/2]$$

$$= \frac{-10 \pm 2\sqrt{23}}{2}$$

$$= \frac{2(-5 \pm \sqrt{23})}{2} \quad [1/2]$$

$$\text{Ans. } \therefore x = -5 + \sqrt{23} \text{ or } x = -5 - \sqrt{23} \quad [1/2] [3]$$

- (3) A two digit number is formed with digits 2, 3, 5, 7, 9 without repetition. What is the probability of the following events?

Event A: The number formed is an odd number.

Event B: The number formed is a multiple of 5.

Solution:

$$S = \{23, 25, 27, 29, 32, 35, 37, 39, 52, 53, 57, 59, 72, 73, 75, 79, 92, 93, 95, 97\} \quad [1/2]$$

$$\therefore n(S) = 20 \quad [1/2]$$

Event A: The number formed is an odd number.

$$\therefore A = \{23, 25, 27, 29, 35, 37, 39, 53, 57, 59, 73, 75, 79, 93, 95, 97\}$$

$$\therefore n(A) = 16 \quad [1/2]$$

$$P(A) = \frac{n(A)}{n(S)} = \frac{16}{20} = \frac{4}{5} \quad [1/2]$$

Event B: The number formed is a multiple of 5.

$$\therefore B = \{25, 35, 75, 95\}$$

$$\therefore n(B) = 4 \quad [1/2]$$

$$P(B) = \frac{n(B)}{n(S)} = \frac{4}{20} = \frac{1}{5} \quad [1/2] [3]$$

Ans. $P(A) = \frac{4}{5}$ and $P(B) = \frac{1}{5}$

- (4) The frequency distribution table shows the number of mango trees in a grove and their yield of mangoes. Find the median of data:

No. of Mangoes	No. of Trees
50–100	33
100–150	30
150–200	90
200–250	80
250–300	17

Solution:

No. of Mangoes	No. of Trees	c.f. less than type
50–100	33	33
100–150	30	63 $\rightarrow$ c.f.
150–200	90 $\rightarrow$ f	153
200–250	80	233
250–300	17	250

[1]

$$\frac{N}{2} = \frac{250}{2} = 125$$

$$L = 150, f = 90, c.f. = 63, h = 50 \quad [1/2]$$

$$\text{Median} = L + \left[\frac{\frac{N}{2} - c.f.}{f} \right] \times h \quad [1/2]$$

$$= 150 + \left[\frac{125 - 63}{90} \right] \times 50 \quad [1/2]$$

$$= 150 + \frac{62}{90} \times 50$$

$$= 150 + \frac{310}{9}$$

$$= 150 + 34.44$$

$$\text{Ans.} \quad = 184.44 \text{ mangoes} \quad [1/2] [3]$$

Q.4. Solve the following sub-questions. (Any two) [8]

- (1) If the first term of A.P. is p , second term is q and last term is r ,
then show that sum of all terms is $(q + r - 2p) \times \frac{(p + r)}{2(q - p)}$.

Solution:

$$t_1 = p, t_2 = q, t_n = r \quad (\text{Given}) \quad [1/2]$$

$$d = t_2 - t_1 = (q - p)$$

$$t_n = a + (n-1)d \quad [1/2]$$

$$\therefore r = p + (n-1)(q-p) \quad [1/2]$$

$$\therefore (n-1) = \frac{(r-p)}{(q-p)}$$

$$\therefore n = \frac{(r-p)}{(q-p)} + 1$$

$$\therefore n = \frac{(r-p) + (q-p)}{(q-p)}$$

$$\therefore n = \frac{r-p+q-p}{(q-p)}$$

$$\therefore n = \frac{q+r-2p}{(q-p)} \quad [1/2]$$

$$S_n = \frac{n}{2} [t_1 + t_n] \quad [1/2]$$

$$= \frac{(q+r-2p)}{(q-p)} \times (p+r) \quad [1]$$

$$= \frac{(q+r-2p)}{(q-p)} \times \frac{1}{2} \times (p+r)$$

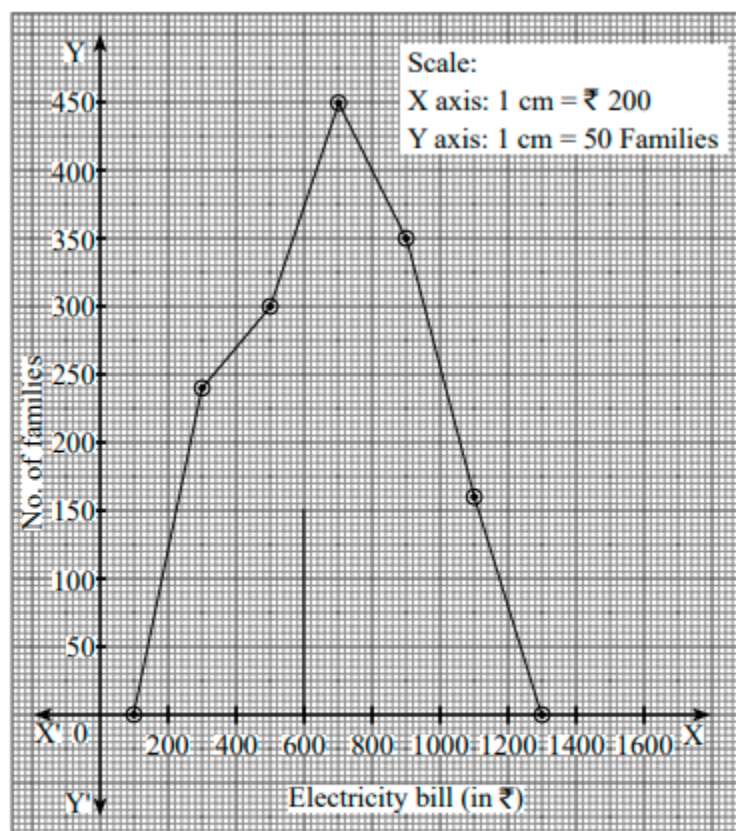
$$= (q+r-2p) \times \frac{(p+r)}{2(q-p)} \quad [1/2] [4]$$

(2) Show the following data by a frequency polygon:

Electricity bill (₹)	Families
200–400	240
400–600	300
600–800	450
800–1000	350
1000–1200	160

Solution:

Class (Electricity bill in ₹)	Class Mark	Frequency (Families)	co-ordinates of points
0–200	100	0	(100, 0)
200–400	300	240	(300, 240)
400–600	500	300	(500, 300)
600–800	700	450	(700, 450)
800–1000	900	350	(900, 350)
1000–1200	1100	160	(1100, 160)
1200–1400	1300	0	(1300, 0)



- For each column 1/2 Mark [1½ + 1/2]
- For correct scale and axes [1/2]
- For frequency polygon [1½] [4]

(3) The sum of the squares of five consecutive natural numbers is 1455. Find the numbers.

Solution:

Let the numbers be $a - 1, a, a + 1, a + 2, a + 3$ [1/2]

$$\therefore (a - 1)^2 + a^2 + (a + 1)^2 + (a + 2)^2 + (a + 3)^2 = 1455$$

(as per given condition) [1/2]

$$\therefore a^2 - 2a + 1 + a^2 + a^2 + 2a + 1 + a^2 + 4a + 4 + a^2 + 6a + 9 = 1455$$

[1/2]

$$\begin{aligned}
 \therefore 5a^2 + 10a + 15 &= 1455 \\
 \therefore 5a^2 + 10a + 15 - 1455 &= 0 \\
 \therefore 5a^2 + 10a - 1440 &= 0 \\
 \therefore a^2 + 2a - 288 &= 0 & [1/2] \\
 \therefore a^2 - 16a + 18a - 288 &= 0 \\
 \therefore a(a - 16) + 18(a - 16) &= 0 \\
 \therefore (a - 16)(a + 18) &= 0 & [1/2] \\
 \therefore a - 16 = 0 \quad \text{or} \quad a + 18 &= 0 & [1/2] \\
 \therefore a = 16 \quad \text{or} \quad a = -18 \\
 \text{But a natural number cannot be negative.} & & [1/2] \\
 \therefore a &= 16 \\
 \therefore a - 1 &= 15 \\
 \text{and } a + 1 &= 17 \\
 a + 2 &= 18 \\
 a + 3 &= 19
 \end{aligned}$$

Ans. The required numbers are 15, 16, 17, 18, 19. [1/2] [4]

Q.5. Solve the following sub-questions. (Any one) [3]

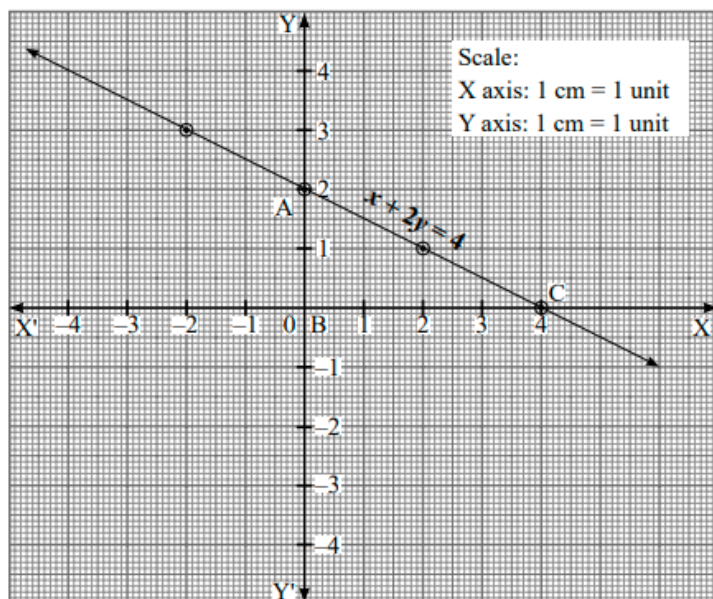
- (1) Draw the graph of the equation $x + 2y = 4$. Find the area of the triangle formed by the line intersecting the X-axis and Y-axis.

Solution:

$$x + 2y = 4$$

$$\therefore x = 4 - 2y$$

x	2	0	-2
y	1	2	3
x, y	(2, 1)	(0, 2)	(-2, 3)



Let $\triangle ABC$ be formed by the line intersecting the X-axis and Y-axis.

Base $BC = 4$ units and height $AB = 2$ units

$$\begin{aligned} A(\triangle ABC) &= \frac{1}{2} \times BC \times AB \\ &= \frac{1}{2} \times 4 \times 2 \\ &= 4 \text{ sq. units} \end{aligned}$$

Ans. Area of the triangle is 4 sq. units.

- To prepare a table [1/2]
- Draw correct line of the given equation [1]
- For finding the area of the triangle by any method [1]
- Area of triangle = 4 sq. units [1/2] [3]

- (2) A survey was conducted for 180 people in a city. 70 ate pizza, 60 ate burgers and 50 ate chips. Draw a pie diagram for the given information.

Solution:

$$\begin{aligned} \theta \text{ for the people who ate pizza} &= \frac{\text{No. of people who ate pizza}}{\text{Total no. of people}} \times 360^\circ \\ &= \frac{70}{180} \times 360^\circ \\ &= 70 \times 2^\circ \\ &= 140^\circ \end{aligned} \quad [1/2]$$

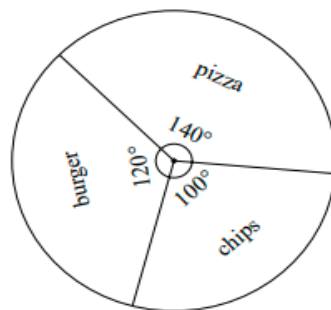
$$\theta \text{ for the people who ate burgers} = \frac{\text{No. of people who ate burgers}}{\text{Total no. of people}} \times 360^\circ$$

$$\begin{aligned}
 &= \frac{60}{180} \times 360^\circ \\
 &= 60 \times 2^\circ \\
 &= 120^\circ \quad [1/2]
 \end{aligned}$$

$$\begin{aligned}
 \theta \text{ for the people who ate chips} &= \frac{\text{No. of people who ate chips}}{\text{Total no. of people}} \times 360^\circ \\
 &= \frac{50}{180} \times 360^\circ \\
 &= 50 \times 2^\circ \\
 &= 100^\circ \quad [1/2]
 \end{aligned}$$

Pie diagram

[1½] [3]



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