



Q1(A))

(1) 28

(2) 15

(3) 2

(4) 1

(B))

(1) $t_n = 3n - 2$

Put $n = 1$

$$t_1 = 3(1) - 2$$

$$t_1 = 3 - 2$$

(2) $17x + 15y = 11$ (1)

$$15x + 17y = 21$$
 (2)

Subtract equation (2) from (1),

$$17x + 15y = 11$$

$$15x + 17y = 21$$

$$- \quad - \quad -$$

$$2x - 2y = -10$$

$$x - y = -5.$$

Divide by 2,

(3) Let 'S' be the sample space

$$S = \{23, 25, 32, 35, 52, 53\}$$

$$n(S) = 6.$$

(4) FV = ₹100, MV = ₹150

Rate of brokerage = 2% of MV

Brokerage paid on one share = 2% of MV

$$= \frac{2}{100} \times 150$$

$$= \frac{30}{10} = ₹3$$

Brokerage paid on one share = ₹3.

Q2(A))

(1) (1) 0, (2) 2, (3) 0, (4) 6

(2) (1) TT, (2) HH, (3) HH (4) TT

(3) (1) 5, (2) 2, (3) 7, (4) 10

(B))

(1) 7, 13, 19, 25, ...

$$a = 7, d = 13 - 7 = 6, n = 19, t_{19} = ?$$

$$t_n = a + (n - 1)d$$

$$t_{19} = 7 + (19 - 1)(6)$$

$$t_{19} = 7 + 18 \times 6$$

$$t_{19} = 7 + 108$$

$$t_{19} = 115$$

∴ The 19th term of an A.P. is 115.

(2) $x^2 + x - 20 = 0$

$x^2 + 5x - 4x - 20 = 0$

$x(x + 5) - 4(x + 5) = 0$

$(x + 5)(x - 4) = 0$

$(x + 5) = 0$ or $(x - 4) = 0$

$x + 5 = 0$ or $x - 4 = 0$

$x = -5$ or $x = 4$

The roots of the quadratic equation is $x = -5$ or $x = 4$.

(3)

Number of hours daily	Number of workers	Cumulative frequency
8-10	150	150
10-12	500	$150 + 500 = 650$
12-14	300	$650 + 300 = 950$
14-16	50	$950 + 50 = 1000$

(4) In \square DABCD,

Side AB = Side DC [opposite sides of rectangle]

Side AD = Side BC

$2x + y + 8 = 4x - y$

$4x - 2x - y - y - 8 = 0$

$2x - 2y = 8$

$x - y = 4$

Similarly, $2y = x + 4$

$x - 2y = -4$

Divide by 2,

..... (1)

..... (2)

(5) There are 52 cards. $n(S) = 52$

Let A' be the event of getting face cards.

Event A : Getting face cards.

There are 12 face cards in the pack of playing cards.

$n(A) = 12$

$P(A) = n(A)/n(S) = 12/52$

$P(A) = 3/13$.

Q3(A)

(1)

Activity:

Total value for toy car with GST = ₹2360.

Rate of GST 18%

Let taxable value for toy car be ₹x.

$$\therefore \text{GST} = \frac{18}{100} \times x$$

\therefore Total value for toy car Taxable value for toy car + GST [Formula]

$$2360 = \boxed{x} + \frac{\boxed{18}}{100} \times x$$

$$\therefore 2360 = \frac{\boxed{118}}{100} \times x$$

$$\therefore 2360 \times 100 = 118x$$

$$\therefore x = \frac{2360 \times 100}{\boxed{118}}$$

\therefore Taxable value for toy is ₹ 20,00

(2) From the given table

Modal class = 3.5 – 6.5 (\therefore This class has max. frequency)

$$\text{Mode} = \boxed{l} + \left[\frac{f_1 - f_0}{2f_1 - f_0 - \boxed{f_2}} \right] \times h$$

l = Lower class boundary of the modal class

f_1 = 40 (Frequency of modal class)

f_2 = 27 (Frequency of the class succeeding the modal class)

f_0 = 33 (frequency of the class preceding the modal class)

$$\text{Mode} = 3.5 + \left[\frac{40 - 33}{2(40) - 33 - 27} \right] \times \underline{3}$$

$$\text{Mode} = 3.5 + \left[\frac{7}{80 - 60} \right] \times 3$$

Mode = 4.55

The mode of the volume of petrol filled is 4.55.

(B))

(1) $3m^2 - m - 10 = 0$

Comparing with standard form $ax^2 + bx + c = 0$

$$a = 3, b = -1, c = -10$$

$$D = b^2 - 4ac$$

$$= (-1)^2 - 4(3)(-10)$$

$$= 1 - 12 \times -10$$

$$= 1 + 120$$

$$= 121 > 0$$

By formula method,

$$m = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$m = \frac{-(-1) \pm \sqrt{121}}{2(3)}$$

$$m = \frac{1 \pm \sqrt{121}}{6}$$

$$m = \frac{1 + \sqrt{121}}{6} \text{ or } m = \frac{1 - \sqrt{121}}{6}$$

$$m = \frac{1 + 11}{6} \text{ or } m = \frac{1 - 11}{6}$$

$$m = \frac{12}{6} \text{ or } m = \frac{-10}{6}$$

$$m = 2 \text{ or } m = \frac{-5}{3}$$

The roots of the quadratic equation are $m = 2$ or $m = \frac{-5}{3}$

(2) $3x - 4y = 10$

$4x + 3y = 5$

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

$$= (3 \times 3) - (-4 \times 4)$$

$$= 9 - (-16) = 9 + 16$$

$$\therefore D = 25$$

$$D_x = \begin{vmatrix} 10 & -4 \\ 5 & 3 \end{vmatrix}$$

$$= (10 \times 3) - (-4 \times 5)$$

$$= 30 - (-20)$$

$$= 30 + 20$$

$$\therefore D_x = 50$$

$$D_y = \begin{vmatrix} 3 & 10 \\ 4 & 5 \end{vmatrix}$$

$$= (3 \times 5) - (10 \times 4)$$

$$= 15 - 40$$

$$\therefore D_y = -25$$

By Cramer's rule

$$x = \frac{D_x}{D} = \frac{50}{25} = 2 \text{ and}$$

$$y = \frac{D_y}{D} = \frac{-25}{25} = -1$$

$\therefore x = 2$ and $y = -1$ is the solution of given simultaneous equations.

(3) One coin and one die are rolled.

$$S = \{T1, T2, T3, T4, T5, T6, H1, H2, H3, H4, H5, H6\}$$

$$n(S) = 12$$

$$n(A) = 3 \quad P(A) = n(A)/n(S) = 3/12 = 1/4$$

Event B: To get a tail and an odd number.

$$B = \{T1, T3, T5\}$$

$$n(B) = 3$$

$$P(B) = n(B)/n(S) = 3/12 = 1/4$$

$$P(A) = 1/4$$

$$P(B) = 1/4$$

(4) No. of shares = 50, FV = ₹10, MV = ₹25, Rate of dividend = 30%

$$(1) \text{ Sum invested} = \text{No. of shares} \times \text{MV} \\ = 50 \times 25 = ₹1250.$$

$$(2) \text{ Dividend received, Dividend} = \text{Rate of dividend}/100 \times \text{FV} \\ = 30/100 \times 10 = ₹3$$

$$\text{Total dividend} = \text{No. of shares} \times \text{Dividend} \\ = 50 \times 3 = ₹150$$

$$\text{Dividend received} = ₹150.$$

$$(3) \text{ Rate of return, Rate of return} = \text{Dividend} / \text{Sum invested} \times 100 \\ = 150/1250 \times 100 \\ = 1500/125 = 12\%$$

$$\text{Rate of dividend} = 12\%$$

Q4)

(1) 2020 is a leap year. In February month there are 29 days.

$$n = 29$$

On first day of the month Kavita invested ₹20.

On second day she invested = ₹40.

On third day she invested = ₹60.

Kavita's investment is in A.P. 20, 40, 60, ...

$$a = 20, n = 29, d = 20$$

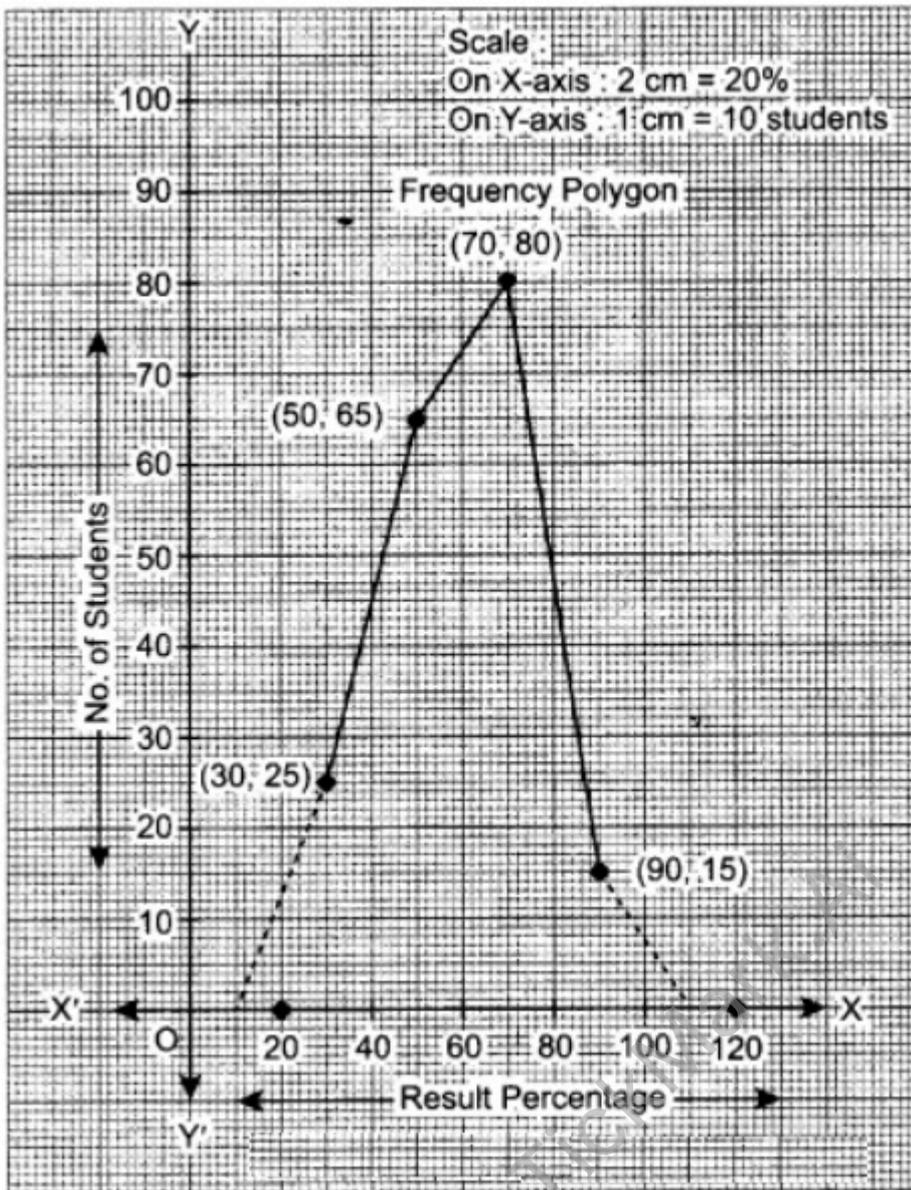
$$S_n = n/2[2a + (n - 1)d]$$

$$S_{29} = 29/2[2(20) + (29 - 1)20] \\ = 29/2[40 + 28 \times 20] \\ = 29/2[40 + 560] \\ = 29/2 \times 600 \\ = 29 \times 300 \\ = 8700$$

Kavita's total saving of the month of February is ₹8,700.

(2)

Result (Percentage)	Class Mark	No. of Students	Points
20-40	30	25	(30, 25)
40-60	50	65	(50, 65)
60-80	70	80	(70, 80)
80 -100	90	15	(90,15)



(3)

Let bigger tap takes x hours to fill the tank and smaller tank takes $x + 5$ hours to fill the tank. In one hour, Bigger tap takes $\frac{1}{x}$ hours and smaller tap will take $\frac{1}{x+5}$ hours and both the tap will take $\frac{1}{6}$ hours to fill the tank.

According to the given condition,

$$\frac{1}{x} + \frac{1}{x+5} = \frac{1}{6}$$

$$\frac{x+5+x}{x(x+5)} = \frac{1}{6}$$

$$\frac{2x+5}{x^2+5x} = \frac{1}{6}$$

$$6(2x + 5) = x^2 + 5x$$

$$12x + 30 = x^2 + 5x$$

$$x^2 + 5x - 12x - 30 = 0$$

$$x^2 - 7x - 30 = 0$$

$$x^2 - 10x + 3x - 30 = 0$$

$$x(x - 10) + 3(x - 10) = 0$$

$$(x - 10)(x + 3) = 0$$

$$x - 10 = 0 \text{ or } (x + 3) = 0$$

$$x = 10 \text{ or } x = -3$$

But $x \neq -3$

\therefore Time cannot be negative.

Bigger tap, $x = 10$ hours

Smaller tap, $x + 5 = 10 + 5 = 15$ hours

Bigger tap takes 10 hours and smaller tap takes 15 hours to fill the tank.

Q5)

(1) $x + y = 4$

$$x = 4 - y$$

Substitute $y = 2$

$$x = 4 - 2$$

$$x = 2$$

Substitute $y = 0$

$$x = 4 - 0$$

$$x = 4$$

Substitute $y = 1$

$$x = 4 - 1$$

$$x = 3$$

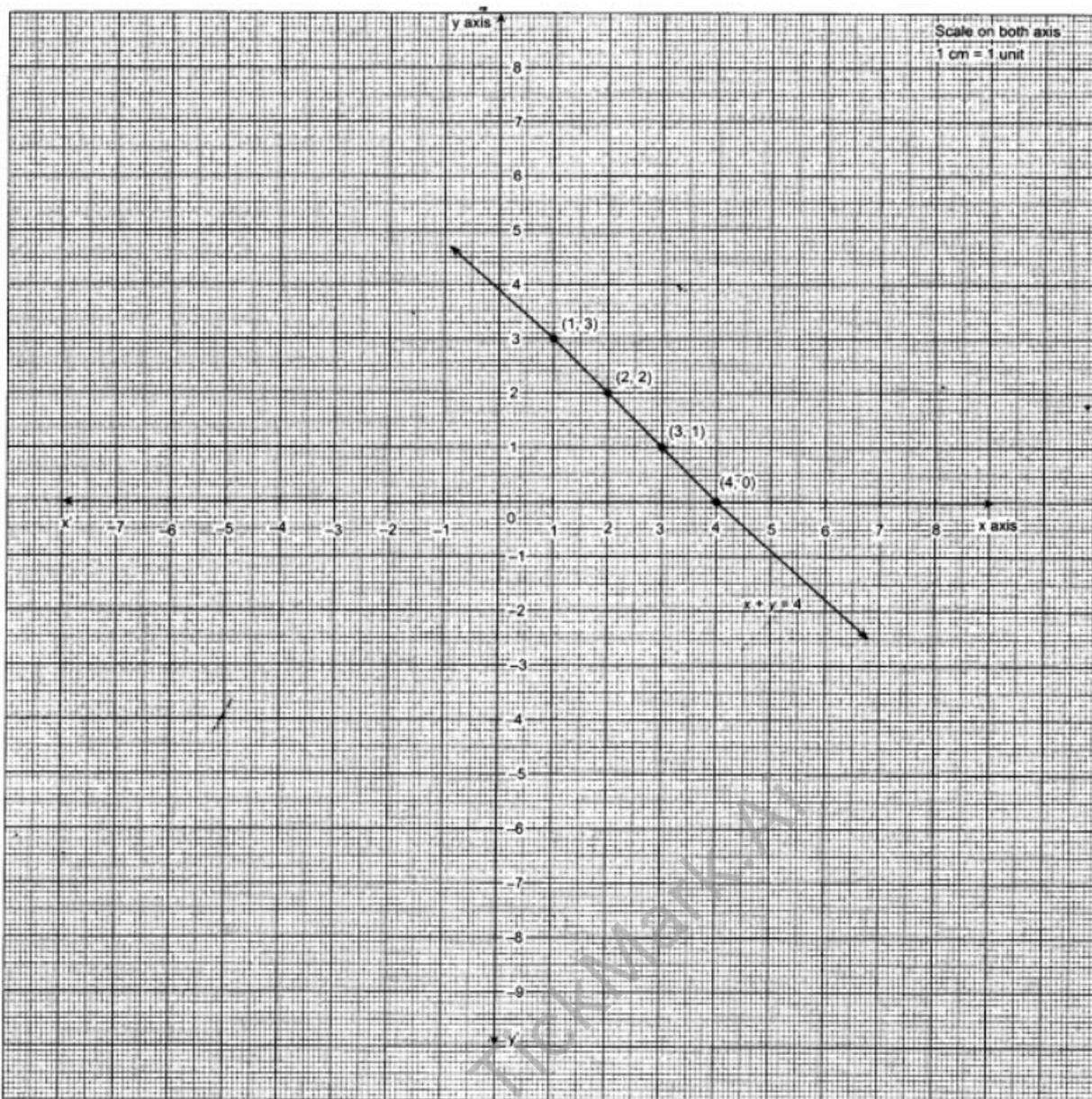
Substitute $y = 3$

$$x = 4 - 3$$

$$x = 1$$

x	2	3	1	4
y	2	1	3	0
(x, y)	(2,2)	(3,1)	(1,3)	(4,0)

(a) Isosceles right angled triangle is formed by the line with X and Y-axes based on its sides.



(b) Height = 4 cm

Base = 4 cm

Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

$$= \frac{1}{2} \times 4 \times 4 = \frac{1}{2} \times 16 = 8 \text{ cm}^2$$

Area of triangle = 8 cm^2 .

(2) (a) Let total amount spent on sports be x .

Central angle for football = 45°

Amount spent on football = 9,000

Central angle = Amount spent on football \times $360/\text{Total amount spent on sports}$

$$45 = 9,000/x \times 360$$

$$x = 9000 \times 360/45$$

$$x = 200 \times 360$$

$$x = 72,000$$

Total amount spent on sports is 72,000.

(b) Let amount spent on cricket by y .

Central angle for cricket = 160°

Total amount spent on sports ₹72,000

Central angle = Amount spent on cricket

Total amount spent on sports \times 360

$$160 = y/72,000 \times 360$$

$$y = 160 \times 72,000 / 360$$

$$y = ₹32,000$$

Amount spent on cricket is ₹32,000.

All the Best

TickMark.Ai