

SOLUTION : PRACTICE QUESTION PAPER 1

- Q. 1. (A)** (i) (A)
(ii) (B)
(iii) (A)
(iv) (D).

Q. 1. (A) Explanation to the answers to MCQs in this question has been given below for students' guidance. Please note that, **Students are not expected to write the explanation in the examination.**

Explanations :

- (i) Substitute $y = 3$ in the given equation.
(ii) $d = (x + 3) - (x - 1) = (3x + 1) - (x + 3)$
Solving simple equations, find the value of x . Hence, find the value of d .
(iii) There are 8 cards bearing numbers multiple of 5 from cards 1 to 40.
(iv) Use the formula : $\alpha + \beta = \frac{-b}{a}$.

Q. 1. (B) (i) Solution :

FV = ₹ 100, MV = ₹ 150, Dividend = 10%

Shweta purchased 5 shares of FV ₹ 100.

Dividend = 10% = ₹ 10 per share of FV ₹ 100.

∴ dividend on 5 shares = ₹ 10 × 5 = ₹ 50

Ans. Shweta gets dividend ₹ 50.

(ii) Solution :

$$4y = 12 - 3x$$

$$\therefore 4y + 3x - 12 = 0$$

$$\text{i.e. } 3x + 4y - 12 = 0$$

Ans. The general form is $3x + 4y - 12 = 0$.

(iii) Solution :

Let $\alpha = -3$ and $\beta = -5$

$$\alpha + \beta = -3 + (-5) = -8; \quad \alpha\beta = (-3) \times (-5) = 15$$

The required quadratic equation is

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

$$\text{i.e. } x^2 - (-8)x + 15 = 0 \quad \text{i.e. } x^2 + 8x + 15 = 0$$

Ans. The quadratic equation is $x^2 + 8x + 15 = 0$.

(iv) **Solution :**

$$S = \{1, 2, 3, 4, 5, 6\}$$

$$\text{Event } A = \{1, 3, 5\}$$

Ans. Event $A = \{1, 3, 5\}$.

Q. 2. (A) (i) Activity :

x	4	-1	0
y	0	-5	-4
(x, y)	$(4, 0)$	$(-1, -5)$	$(0, -4)$

$$[x - y = 4$$

$$\therefore 4 - y = 4 \quad \dots \text{ (Substituting } x = 4)$$

$$\therefore -y = 4 - 4 \quad \therefore -y = 0 \quad \text{i.e. } y = 0$$

$$x - y = 4$$

$$\therefore x - (-5) = 4 \quad \dots \text{ (Substituting } y = -5)$$

$$\therefore x + 5 = 4 \quad \therefore x = 4 - 5 \quad \text{i.e. } x = -1$$

$$x - y = 4$$

$$\therefore 0 - y = 4 \quad \dots \text{ (Substituting } x = 0)$$

$$\therefore -y = 4 \quad \therefore y = -4.]$$

(ii) Activity :

$$\text{Here, } a = 1, d = 2, t_n = 149$$

$$t_n = a + (n - 1)d \quad \dots \text{ (Formula)}$$

$$\therefore 149 = 1 + (n - 1) \times 2 \quad \dots \text{ (Substituting the values)}$$

$$\therefore 149 = 2n - 1 \quad \therefore n = 75.$$

(iii) Activity :

If two coins are tossed simultaneously.

$$S = \{HH, HT, TH, TT\}$$

(i) Event A : at least getting one head.

$$\therefore A = \{HH, HT, TH\}$$

(ii) Event B : to get no head.

$$\therefore B = \{TT\}.$$

Q. 2. (B) (i) Solution :

$$4x + 3y = 11 \quad \dots (1)$$

$$3x + 4y = 10 \quad \dots (2)$$

Multiplying equation (1) by 4,

$$16x + 12y = 44 \quad \dots (3)$$

Multiplying equation (2) by 3,

$$9x + 12y = 30 \quad \dots (4)$$

Subtracting equation (4) from equation (3),

$$16x + 12y = 44 \quad \dots (3)$$

$$9x + 12y = 30 \quad \dots (4)$$

$$\begin{array}{r} - \quad - \quad - \\ \hline 7x \quad = 14 \end{array}$$

$$\therefore x = 2 \quad \dots \text{(Dividing both the sides by 7)}$$

Substituting $x = 2$ in equation (1),

$$4(2) + 3y = 11 \quad \therefore 8 + 3y = 11 \quad \therefore 3y = 11 - 8$$

$$\therefore 3y = 3$$

$$\therefore y = 1 \quad \dots \text{(Dividing both the sides by 3)}$$

Ans. $(x, y) = (2, 1)$ is the solution.

(ii) Solution :

Comparing the equation $2x^2 - 7x - 2 = 0$ with $ax^2 + bx + c = 0$,

$$a = 2, b = -7, c = -2$$

$$\begin{aligned} \Delta &= b^2 - 4ac = (-7)^2 - 4(2)(-2) \\ &= 49 + 16 = 65 \end{aligned}$$

Here, $\Delta > 0$

Ans. The roots are **real and unequal**.

(iii) Solution :

$$FV = ₹ 100; MV = ₹ 120$$

For getting 1 share of FV ₹ 100, the investment is ₹ 120.

Dividend = 15% = ₹ 15 per share of ₹ 100.

$$\begin{aligned} \text{Rate of return} &= \frac{\text{Dividend income}}{\text{Sum invested}} \times 100 \\ &= \frac{15}{120} \times 100 = 12.5 \end{aligned}$$

Ans. The rate of return for Amol is **12.5%**.

[**Note :** To find the rate of return, the numbers of share purchased is immaterial.]

(iv) Solution :

$$\text{Here, } a = t_1 = 5, t_{10} = 95 = t_n, S_{10} = ?$$

$$S_n = \frac{n}{2} [t_1 + t_n] \quad \dots \text{(Formula)}$$

$$\therefore S_{10} = \frac{10}{2} [5 + 95] \quad \dots \text{ (Substituting the values)}$$

$$= 5 \times 100$$

$$\therefore S_{10} = 500$$

$$\text{Ans. } S_{10} = 500.$$

(v) Solution :

Here, $L = 60$, $h = 20$, $f_1 = 100$, $f_0 = 70$, $f_2 = 80$

$$\begin{aligned} \text{Mode} &= L + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right] \times h \\ &= 60 + \left[\frac{100 - 70}{2 \times 100 - 70 - 80} \right] \times 20 \\ &= 60 + \frac{30}{200 - 150} \times 20 \\ &= 60 + \frac{30}{50} \times 20 \\ &= 60 + 12 = 72 \end{aligned}$$

Ans. Mode is **72**.

Q. 3. (A) (i) Activity :

Here, $a = 1$, $b = -10$, $c = -24$

$$b^2 - 4ac = \boxed{(-10)^2} - 4 \times 1 \times (-24) = \boxed{100} + 96 = \boxed{196}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-10) \pm \sqrt{\boxed{196}}}{2 \times 1} = \frac{10 \pm \boxed{14}}{2}$$

$$\therefore x = 12 \quad \text{or} \quad x = -2.$$

(ii) Activity :

The cumulative frequency which is just greater than 125 is **153**.

\therefore the corresponding class **150–200** is the median class.

$$L = 150, f = 90, cf = \boxed{63}, h = 50$$

$$\begin{aligned} \text{Median} &= L + \left[\frac{\frac{N}{2} - cf}{f} \right] \times h \\ &= 150 + \left[\frac{\boxed{125 - 63}}{90} \right] \times 50 \\ &= 150 + \frac{\boxed{62}}{90} \times 50 \approx 184.4 \end{aligned}$$

The median data is 184.4 mangoes.

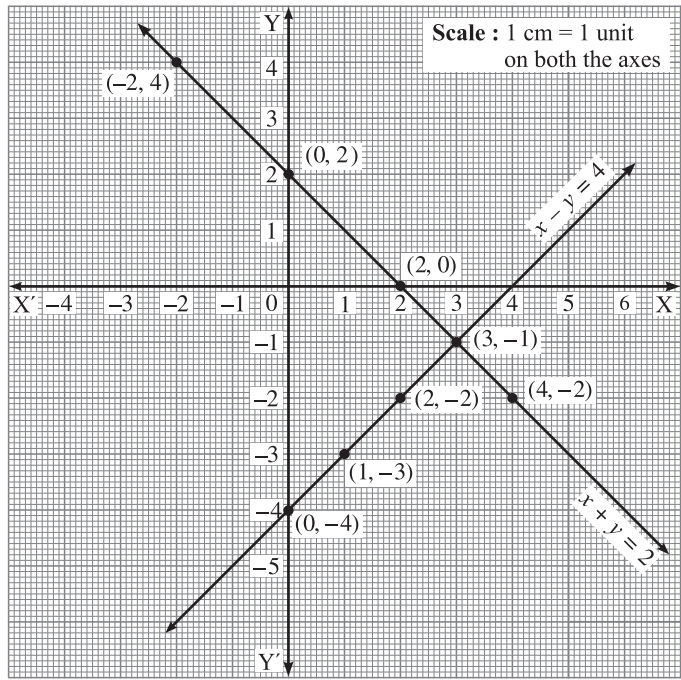
Q. 3. (B) (i) Solution :

$x + y = 2 \quad \therefore y = 2 - x$

x	-2	0	2	4
y	4	2	0	-2
(x, y)	$(-2, 4)$	$(0, 2)$	$(2, 0)$	$(4, -2)$

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

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



The coordinates of the point of intersection are $(3, -1)$.

Ans. The solution of the given simultaneous equations is $x = 3$ and $y = -1$.

(ii) Solution : Let the cost price of the toy be ₹ x .

Gain is as much per cent as the cost price of the toy.

$\therefore \text{gain} = x\% \text{ of } x = \frac{x}{100} \times x = ₹ \frac{x^2}{100}$

Cost price + gain = selling price

$\therefore x + \frac{x^2}{100} = 24$

Multiplying both the sides by 100,

$100x + x^2 = 2400$

$\therefore x^2 + 100x - 2400 = 0$

$$\therefore x^2 + 120x - 20x - 2400 = 0$$

$$\therefore x(x + 120) - 20(x + 120) = 0$$

$$\therefore (x + 120)(x - 20) = 0$$

$$\therefore x + 120 = 0 \quad \text{or} \quad x - 20 = 0$$

$$\therefore x = -120 \quad \text{or} \quad x = 20$$

But the price cannot be negative.

$$\therefore x = -120 \text{ is unacceptable.} \quad \therefore x = 20$$

Ans. The cost price of the toy is ₹ 20.

$$\begin{array}{r} -2400 \\ +120-20 \end{array}$$

(iii) Solution : Discount 5% of ₹ 1000 = $\frac{5}{100} \times 1000 = ₹ 50$

$$\therefore \text{taxable value} = ₹ (1000 - 50) = ₹ 950$$

Rate of GST = 5%

$$\therefore \text{GST} = \frac{5}{100} \times 950 = ₹ 47.50$$

Purchase price for the customer

$$= \text{Taxable value} + \text{GST} = ₹ (950 + 47.50) = ₹ 997.50$$

Ans. The purchase price of the dress for the customer is ₹ 997.50.

(iv) Solution :

Time (hours)	Class mark (x_i)	Frequency (Number of students) (f_i)	$x_i f_i$
0 – 2	1	10	10
2 – 4	3	16	48
4 – 6	5	20	100
6 – 8	7	4	28
Total		$\Sigma f_i = 50$	$\Sigma x_i f_i = 186$

Here, $\Sigma x_i f_i = 186$, $\Sigma f_i = 50$

$$\text{Mean} = \bar{X} = \frac{\Sigma x_i f_i}{\Sigma f_i} = \frac{186}{50} = 3.72$$

Ans. The mean time spent by the students for studies is **3.72 hours**.

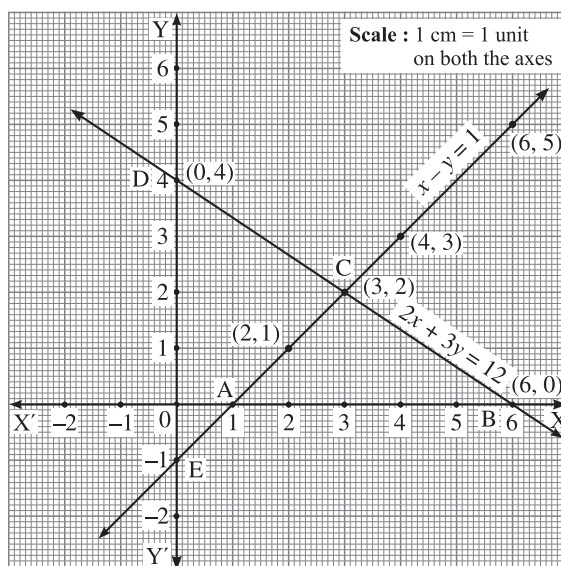
Q. 4. (i) Solution :

$$x - y = 1 \quad \therefore y = x - 1$$

x	2	4	6
y	1	3	5
(x, y)	(2, 1)	(4, 3)	(6, 5)

$$2x + 3y = 12 \quad \therefore y = \frac{12 - 2x}{3}$$

x	0	3	6
y	4	2	0
(x, y)	(0, 4)	(3, 2)	(6, 0)



From the graph (1) $\triangle ABC$ is formed by the two lines and the X-axis.

(2) $\triangle CDE$ is formed by the two lines and the Y-axis.

For $\triangle ABC$, $AB = 5$ units and the perpendicular drawn from point C on the X-axis is 2 units.

$$\therefore A(\triangle ABC) = \frac{1}{2} \times 5 \times 2 = 5 \text{ sq units.}$$

For $\triangle CDE$, $DE = 5$ units and the perpendicular drawn from point C on the Y-axis is 3 units.

$$\therefore A(\triangle CDE) = \frac{1}{2} \times 5 \times 3 = 7.5 \text{ sq units.}$$

Ans. The area of triangles are **5** sq units and **7.5** sq units respectively.

(ii) $n(S) = 16$, $n(R) = x$.

Probability of getting a red ball

$$P_1(R) = \frac{n(R)}{n(S)} = \frac{x}{16} \quad \dots (1)$$

8 more red balls are put in the bag.

$$\therefore n(S) = 24, n(R) = (x + 8)$$

Probability of getting a red ball

$$P_2(R) = \frac{n(R)}{n(S)} = \frac{x + 8}{24} \quad \dots (2)$$

From the given condition,

$$P_2(R) = 2 \frac{4}{9} P_1(R)$$

$$\therefore \frac{x+8}{24} = \frac{22}{9} \times \frac{x}{16}$$

Multiplying both the sides by 144,

$$6(x+8) = 22x$$

$$\therefore 6x + 48 = 22x \quad \therefore 48 = 22x - 6x$$

$$\therefore 16x = 48 \quad \therefore x = 3$$

Ans. Initially there were **3 red** balls in the bag.

(iii) Solution :

$$15 + a + 30 + b + 15 + 10 = 100$$

$$\therefore a + b + 70 = 100 \quad \therefore a + b = 100 - 70 \quad \therefore a + b = 30 \quad \dots (1)$$

Now, $a = 2b$ Substituting the value of a in equation (1),

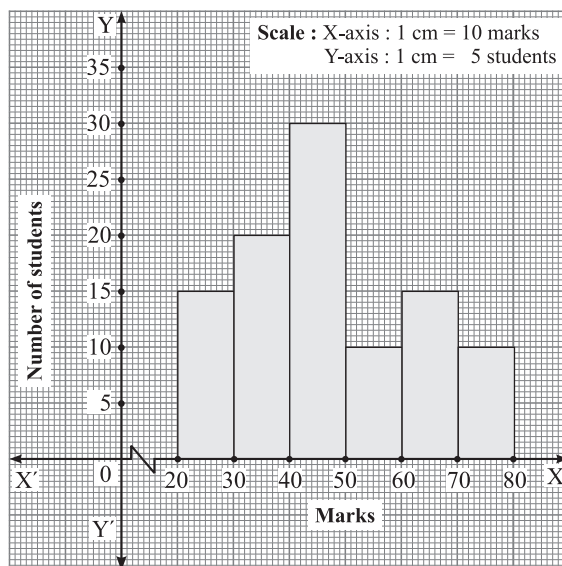
$$2b + b = 30 \quad \therefore 3b = 30 \quad \therefore b = 10$$

$$a = 2b = 2 \times 10 = 20 \quad \therefore a = 20$$

The value of a is 20 and that of b is 10.

Tabulation for histogram :

Marks	20–30	30–40	40–50	50–60	60–70	70–80	Total
Number of students	15	20	30	10	15	10	100



Q. 5. (i) Solution :

(1) Let Payal's age be x years.

(2) From the first condition, Sonal's age is $(x + 12)$ years.

(3) The reciprocal of Payal's age is $\frac{1}{x}$ years and that of Sonal's age is $\frac{1}{x+12}$ years.

(4) The sum of the reciprocal of their ages is $\frac{1}{8}$.

$$\therefore \frac{1}{x} + \frac{1}{x+12} = \frac{1}{8}$$

$$\therefore \frac{x+12+x}{x(x+12)} = \frac{1}{8}$$

$$\therefore \frac{2x+12}{x^2+12x} = \frac{1}{8}$$

$$\therefore 8(2x+12) = x^2+12x \quad \dots \text{ (Cross multiplying)}$$

$$\therefore 16x+96 = x^2+12x$$

$$\therefore x^2+12x-16x-96=0$$

$$\therefore x^2-4x-96=0$$

$$\therefore x^2-12x+8x-96=0$$

$$\therefore x(x-12)+8(x-12)=0$$

$$\therefore (x-12)(x+8)=0 \quad \therefore x-12=0 \quad \text{or} \quad x+8=0$$

$$\therefore x=12 \quad \text{or} \quad x=-8 \quad \text{But the age cannot be negative.}$$

$$\therefore x=-8 \text{ is unacceptable.} \quad \therefore x=12 \text{ and } x+12=12+12=24.$$

Ans. Payal's age is **12 years**. Sonal's age is **24 years**.

(ii) Solution :

Let the first term of the A.P. be a and the common difference d .

Here, $t_9 = 75$ and $t_{21} = 183$, $t_{15} = ?$

$$t_n = a + (n-1)d \quad \dots \text{ (Formula)}$$

$$\therefore t_9 = 75 = a + (9-1)d \quad \dots \text{ (Substituting the values)}$$

$$\therefore 75 = a + 8d \quad \dots (1)$$

$$\text{Similarly, } t_{21} = 183 = a + (21-1)d$$

$$\therefore 183 = a + 20d \quad \dots (2)$$

Adding equations (1) and (2),

$$a + 8d = 75 \quad \dots (1)$$

$$a + 20d = 183 \quad \dots (2)$$

$$2a + 28d = 258$$

$$\therefore a + 14d = 129 \quad \dots \text{ (Dividing both the sides by 2) } \dots (3)$$

$$\text{Now, } t_{15} = a + (15-1)d$$

$$\therefore t_{15} = a + 14d$$

$$\therefore t_{15} = 129 \quad \dots \text{ [From (3)]}$$

Ans. The 15th term of the A.P. is **129**.