

**Maharashtra State Board  
Class X Maths Algebra  
Answers Set-2**

Q 1. (A)

4

(1)  $A = \{1, 2, 3, 4, 5\}, \quad B = \{5, 6, 7\}$

$\therefore A \cup B = \{1, 2, 3, 4, 5, 6, 7\}$

(2)  $\sqrt{50} = \sqrt{25 \times 2}$   
 $= 5\sqrt{2}$

(3) Any trinomial of degree 7. For example,  $2x^7 + x - 10$

(4)  $15 : 20 = \frac{15}{20} = \frac{15 \times 5}{20 \times 5} = \frac{75}{100}$  That is, 75%

(5)  $3x + 5y = 9$  .....(1)

$5x + 3y = 7$  .....(2)

$\frac{8x + 8y = 16}{\dots\dots\dots}$  Adding (1) and (2)

$x + y = 2$  ..... dividing by 8

(6) The lower and upper class limits of class 35 to 40 are 35 and 40 respectively.

(B)

4

(1) Mean  $= \frac{10 + 7 + 5 + 3 + 9 + 6 + 9}{7}$   
 $= \frac{49}{7}$

$\therefore$  Mean of yield per acre prouce is 7 quintals.

(2) Suppose, the amount sent to Alka every month is  $x$ . She spends 90% of it.

$\therefore$  She saves 10 % of the amount, which is ₹ 120

$\therefore 120 = x \times \frac{10}{100}$

$\therefore 120 \times 10 = x$

$\therefore x = 1200$

$\therefore$  Amount sent to Alka every month is ₹ 1200.

(3)  $P(y) = y^2 - 2y + 5$

$\therefore P(2) = 2^2 - 2 \times 2 + 5$

$= 4 - 4 + 5$

$= 5$

Q. 2 (A)

(1) C

(2) A

(3) A

(4) C

4

(B)

(1) Let A be the event that a card selected at random is a spade.

In given example,  $n(S) = 52$

$$\therefore n(A) = 13$$

$$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{13}{52} = \frac{1}{4}$$

(2)

Age Group (Yrs.)	No. of persons	Measure of central angle
20-25	80	$\frac{80}{200} \times 360 = 144^\circ$
25-30	60	$\frac{60}{200} \times 360 = 108^\circ$
30-35	35	$\frac{35}{200} \times 360 = 63^\circ$
35-40	25	$\frac{25}{200} \times 360 = 45^\circ$
Total	200	

(3) The MV of a share is Rs. 200

$$\therefore \text{Brokerage} = 200 \times \frac{0.3}{100} = 0.60 \text{ rupees.}$$

$$\therefore \text{Purchase value of a share} = 200 + 0.60 = ₹ 200.60$$

Q. 3 (A)

(1)  $x - y = 1$

$x$	0	$\boxed{1}$
$y$	$\boxed{-1}$	0
$(x, y)$	$\boxed{(0, -1)}$	$\boxed{(1, 0)}$

4

(2) In the A.P. 1,3,5,...,149

$$a = 1, d = 2, t_n = 149$$

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

$$149 = 1 + (n-1) \times 2$$

$$149 = 1 + 2n - 2$$

$$149 = 2n - 1$$

$$\therefore 2n = 150$$

$$\therefore n = 75$$

(3)  $\therefore n(S) = 42$

$$\therefore n(A) = 3$$

$$\therefore P(A) = \frac{n(A)}{n(S)}$$

$$\therefore P(A) = \frac{1}{14}$$

Q. 3 (B)

4

(1)  $5m^2 - 22m - 15 = 0$

$$\therefore 5m^2 - 25m + 3m - 15 = 0$$

$$\therefore 5m(m - 5) + 3(m - 5) = 0$$

$$\therefore (m - 5)(5m + 3) = 0$$

$$\therefore m - 5 = 0 \text{ or } 5m + 3 = 0$$

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

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

$$4x + 3y = 5$$

$$\therefore Dx = \begin{vmatrix} 10 & -4 \\ 5 & 3 \end{vmatrix} = 10 \times 3 - 5 \times (-4) = 30 + 20 = 50$$

$$\therefore Dy = \begin{vmatrix} 3 & 10 \\ 4 & 5 \end{vmatrix} = 3 \times 5 - 4 \times 10 = 15 - 40 = -25$$

(3)  $a = 10,000$ ,  $d = 2000$ ,  $S_{12} = ?$

$$S_n = \frac{n}{2}[2a + (n-1)d]$$
$$\therefore S_{12} = \frac{12}{2}[2 \times 10,000 + (12-1) \times 2000]$$
$$= 6(20,000 + 11 \times 2000)$$
$$= 6(20,000 + 22,000)$$
$$= 6 \times 42,000$$
$$= 2,52,000$$

Q. 4

9

(1)

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

Here,  $a = 1$ ,  $b = -2$ ,  $c = -7$

$$\alpha + \beta = \frac{-b}{a} = \frac{-(-2)}{1} = 2$$

$$\alpha \beta = \frac{c}{a} = \frac{-7}{1} = -7$$

$$\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$$
$$= (2)^2 - 2 \times (-7)$$
$$= 4 + 14$$
$$= 18$$

(2) In three digit natural numbers, the numbers divisible by 5 are 100, 105, ..., 995.

This is an A.P. with  $a = 100$ ,  $d = 5$  and  $t_n = 995$

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

$$\therefore 995 = 100 + (n-1)5$$

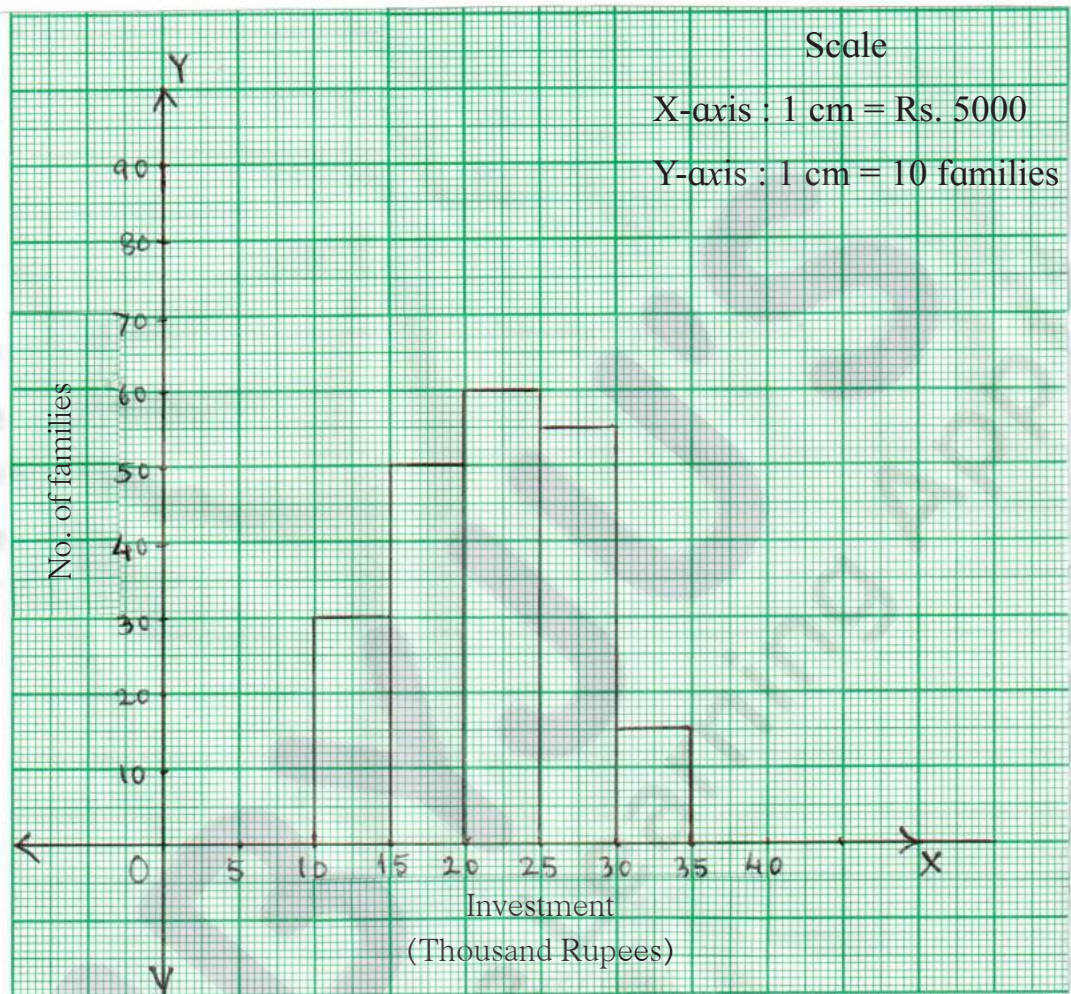
$$\therefore 995 - 100 = (n-1)5$$

$$\therefore \frac{895}{5} = n - 1$$

$$\therefore 179 = n - 1$$

$$\therefore n = 180 \quad \therefore \text{there are 180 numbers.}$$

(3) Histogram



- (4) The sample space,  
 $S = \{10, 12, 13, 14, 20, 21, 23, 24, 30, 31, 32, 34, 40, 41, 42, 43\}$   
 $\therefore n(S) = 16$   
Let A be the event that the number is a prime.  
 $\therefore A = \{13, 23, 31, 41, 43\}$   
 $\therefore n(A) = 5$   
 $\therefore P(A) = \frac{n(A)}{n(S)} = \frac{5}{16}$

**Q. 5**

4

- (1) Suppose, Vivek completes a work in  $x$  days.  
Yogesh completes the same work in  $(x + 3)$  days.

$$\therefore \text{Work done by Vivek in one day} = \frac{1}{x}$$

$$\text{and work done by Yogesh in one day} = \frac{1}{x+3}$$

$$\text{Work done by both of them together in one day} = \frac{1}{2}$$

from the given condition,

$$\frac{1}{x} + \frac{1}{x+3} = \frac{1}{2}$$

$$\therefore \frac{x+3+x}{x(x+3)} = \frac{1}{2}$$

$$\therefore \frac{2x+3}{x^2+3x} = \frac{1}{2}$$

$$\therefore x^2 + 3x = 2(2x + 3)$$

$$\therefore x^2 + 3x = 4x + 6$$

$$\therefore x^2 + 3x - 4x - 6 = 0$$

$$\therefore x^2 - x - 6 = 0$$

$$\therefore x^2 - 3x + 2x - 6 = 0$$

$$\therefore x(x-3) + 2(x-3) = 0$$

$$\therefore (x-3)(x+2) = 0$$

$$\therefore x - 3 = 0 \text{ or } x + 2 = 0$$

$$\therefore x = 3 \text{ or } x = -2$$

$$\text{or, } a = 1, b = -1, c = -6$$

$$\begin{aligned} \therefore x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\ &= \frac{1 \pm \sqrt{(-1)^2 - 4(1)(-6)}}{2} \\ &= \frac{1 \pm \sqrt{25}}{2} \end{aligned}$$

$$\therefore x = \frac{1+5}{2} = 3 \text{ or } x = \frac{1-5}{2} = -2$$

but the number of days is not negative

$$\therefore x = 3$$

$$\therefore x + 3 = 3 + 3 = 6$$

$\therefore$  Vivek completes the work in 3 days and Yogesh in 6 days.

(2)

Age (Yrs.)	No. of patients (Frequency)	Cumulative frequency (Less than)
10-20	40	40
20-30	32	72
30-40	35	107
40-50	45	152
50-60	33	185
60-70	15	200

Here  $N = 200 \therefore$  the number  $\frac{N}{2} = 100$  which is included in the class 30-40

$\therefore$  median class is 30 - 40

$\therefore L = 30, cf = 72, f = 35, h = 10$

$$\begin{aligned}\text{Median} &= L + \left[ \frac{\frac{N}{2} - cf}{f} \right] \times h \\ &= 30 + \left( \frac{100 - 72}{35} \right) \times 10 \\ &= 30 + \frac{28 \times 2}{7} \\ &= 30 + 4 \times 2 \\ &= 30 + 8 = 38\end{aligned}$$

$\therefore$  median of ages of patients is 38.

Q. 6 (1)

3

(1) For Krishna Electronics :

Marked price of TV set = ₹ 50000

Discount =  $50000 \times \frac{10}{100} = ₹. 5000$

The taxable value of the TV set =  $50000 - 5000 = ₹ 45000$

Input Tax =  $36000 \times \frac{18}{100} = ₹ 6480$

Output tax =  $45000 \times \frac{18}{100} = ₹ 8100$

(2) Example : The sum of present ages of Madhu and Raju is 11 years. Madhu is elder than Raju by 9 years. Find their present ages.

Solution : Let the present age of Madhu be  $x$  years and the age of Raju be  $y$  years..

$$\therefore x + y = 11 \quad \text{.....(I)}$$

$$x - y = 9 \quad \text{.....(II)}$$

$$2x = 20 \quad \text{adding (I) and (II)}$$

$$\therefore \frac{x = 10}{x = 10}$$

$$x + y = 11$$

$$\therefore 10 + y = 11$$

$$\therefore y = 11 - 10$$

$$\therefore y = 1$$

$\therefore$  Present age of Madhu is 10 years and of Raju is 1 year.