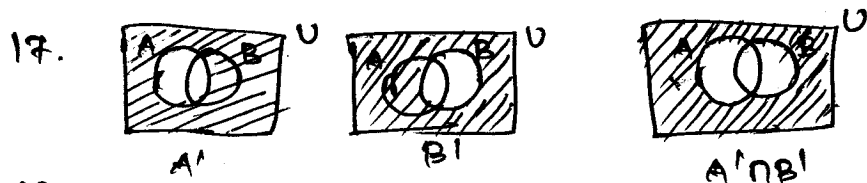


Section - I

1	c	6	d	11	a
2	b	7	d	12	a
3	d	8	c	13	b
4	b	9	d	14	b
5	a	10	a	15	b

Section - II

16. $B \cap C = \{4, 6\}$, $A \cup B \cap C = \{0, 1, 2, 3, 4, 6\}$



18. $a_2 = 5, a_3 = 15, a_4 = 35, a_5 = 75$

19. $r = 8, S_n = 728$

20. $x = 1, y = 5$

21. Quotient = $x^2 + 2x - 1$,
Remainder = 4

22. $\frac{x+2}{(x+2)(x+1)} + \frac{x-3}{(x-3)(x+1)} = \frac{2}{x+1}$

23. $a_{11} = 1, a_{12} = 4, a_{13} = 7, a_{21} = 1, a_{22} = 2, a_{23} = 5$

$A = \begin{pmatrix} 1 & 4 & 7 \\ 1 & 2 & 5 \end{pmatrix}$

24. $6A - 3B = \begin{pmatrix} 0 & -18 \\ 33 & -45 \end{pmatrix}$

25. Area = $\frac{1}{2} \begin{vmatrix} 1 & -3 & -5 & 1 \\ 2 & 4 & -6 & 2 \end{vmatrix} = 22 \text{ sq. units.}$

26. $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2+2}{7-3} = 1$

27. $y - y_1 = m(x - x_1) \Rightarrow y + 4 = \frac{2}{3}(x - 5)$
 $2x - 3y - 22 = 0$

28. $\sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}} = \sqrt{\frac{[1 - \cos \theta]^2}{1 - \cos^2 \theta}} = \frac{1 - \cos \theta}{\sin \theta} = \csc \theta - \cot \theta$

29. In $\triangle ABC$,

$\frac{AB}{AP} = \frac{AC}{AQ} = \frac{5}{3}$

$PQ \parallel BC$

$RD = 3 \text{ cm}$

$AD = AR + RD = 7.5 \text{ cm}$

30. a) $a = 9, b = 15$ (or)

30. b)

$\frac{(\sec \theta - \tan \theta)^2}{\sec^2 \theta - \tan^2 \theta} = \frac{(\sec \theta - \tan \theta)^2}{1}$

$\sec^2 \theta + \tan^2 \theta - 2 \sec \theta \tan \theta$
 $= (1 + \tan^2 \theta) + \tan^2 \theta - 2 \sec \theta \tan \theta$
 $= 1 - 2 \sec \theta \tan \theta + 2 \tan^2 \theta$

Section - III

31. $B \cap C = \{15, 20\}$

$A \cap (B \cap C) = \{10, 25, 30, 35, 40, 45, 50\}$

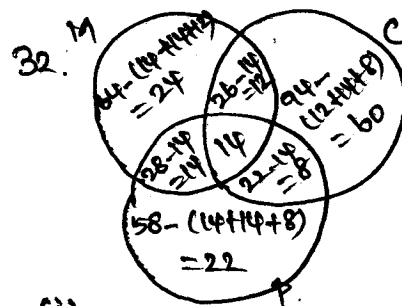
$A \cap B = \{25, 35, 40, 45, 50\}$

$A \cap C = \{10, 25, 30, 40, 50\}$

$(A \cap B) \cup (A \cap C)$

$= \{10, 25, 30, 35, 40, 45, 50\}$

From ①, ② $\textcircled{1} = \textcircled{2}$ $\hookrightarrow \textcircled{2}$

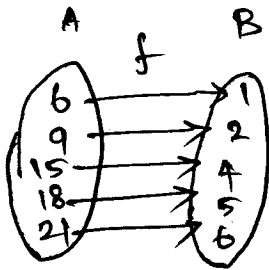


(i) Number of student surveyed = 154

(ii) Number of students had one course only = 106.

33. $f(6) = 1, f(9) = 2, f(15) = 4, f(18) = 5, f(21) = 6$

(i) Arrow Diagram



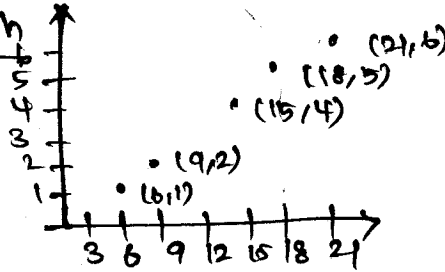
(ii) Set of ordered Pairs

Set $f = \{(6,1), (9,2), (15,4), (18,5), (21,6)\}$

(iii) Table

x	6	9	15	18	21
$f(x)$	1	2	4	5	6

(iv) Graph



34. $S_{11} = 44$

$2a + 10d = 8$

$a + 5d = 4$

$S_{22} = 99$

$2a + 21d = 9$

$d = \frac{1}{11}, a = \frac{39}{11}$

Series $\cdot \frac{39}{11} + \frac{40}{11} + \frac{41}{11} + \dots$

35. $S_n = 7(1 + 11 + 111 + \dots \text{ to } n \text{ terms})$

$= \frac{7}{9}(9 + 99 + \dots \text{ to } n \text{ terms})$

$= \frac{7}{9}[(10 + 100 + 1000 + \dots \text{ to } n \text{ terms}) - (1 + 1 + \dots \text{ to } n \text{ terms})]$

$= \frac{7}{9} \left[\frac{10(10^n - 1)}{10 - 1} - n \right] = \frac{7}{9} \left[\frac{10(10^n - 1)}{9} - n \right]$

36. $P(1) = 0, (x-1)$ is a factor of $P(x)$

$1 \mid \begin{array}{cccc} & 1 & -23 & 142 & -120 \\ & & 0 & 1 & -22 & 120 \\ \hline & 1 & -22 & 120 & 0 & \rightarrow \text{Remainder} \end{array}$

$x^2 - 22x + 120 = (x-12)(x-10)$

$P(x) = (x-1)(x-12)(x-10)$

37. $x^2 - x - 2 = (x-2)(x+1)$

$x^2 + x - 6 = (x+3)(x-2)$

$3x^2 - 13x + 14 = (3x-7)(x-2)$

GCD = $x-2$

38. $x^2 - 3x - 10 = (x-5)(x+2)$

$x^2 - x - 20 = (x-5)(x+4)$

$x^2 - 2x + 4 = x^2 - 2x + 4; x^3 + 8 = (x+2)(x^2 - 2x + 4)$

$\frac{x^2 - 3x - 10}{x^2 - x - 20} \times \frac{x^2 - 2x + 4}{x^3 + 8} = \frac{1}{x+4}$

39. $A+B = \begin{pmatrix} 11 & 50 \\ 7 & 15 \end{pmatrix}$, $(A+B)C = \begin{pmatrix} 62 & 27 \\ 74 & 69 \end{pmatrix} \rightarrow \textcircled{1}$

$AC = \begin{pmatrix} 18 & 9 \\ 38 & 15 \end{pmatrix}$, $BC = \begin{pmatrix} 44 & 18 \\ 36 & 54 \end{pmatrix}$

$AC+BC = \begin{pmatrix} 62 & 27 \\ 74 & 69 \end{pmatrix} \rightarrow \textcircled{2}$

From $\textcircled{1}, \textcircled{2}$ $(A+B)C = AC+BC$

40. $AB = \begin{pmatrix} 8 & -3 \\ 11 & -4 \end{pmatrix}$, $(AB)^T = \begin{pmatrix} 8 & 11 \\ -3 & -4 \end{pmatrix}$, $B^T = \begin{pmatrix} 2 & -1 \\ -1 & 1 \end{pmatrix}$, $A^T = \begin{pmatrix} 5 & 7 \\ 2 & 3 \end{pmatrix}$

$B^T A^T = \begin{pmatrix} 8 & 11 \\ -3 & -4 \end{pmatrix} \rightarrow \textcircled{2}$ From $\textcircled{1}, \textcircled{2}$ $(AB)^T = B^T A^T$

41. Area = $\frac{1}{2} \begin{vmatrix} -5 & + & 1 & -3 & -5 \\ -6 & -1 & 2 & + & -6 \end{vmatrix}$ sq. units

= $\frac{1}{2} \{ (15+8+4+18) - (-24-1-6-20) \} = \frac{1}{2} (86) = 43$ sq. units

42. Intercept form $\frac{x}{a} + \frac{y}{b} = 1 \Rightarrow \frac{x}{a} + \frac{y}{5-a} = 1$

$a^2 - 13a + 30 = 0 \Rightarrow a = 3, a = 10$

Equation: $2x + 3y - 6 = 0, x - 2y - 10 = 0$

43. Statement, Diagram, Given, Proof:

44. $x^2 - y^2 = (a^2 \sec^2 \theta + b^2 \tan^2 \theta + 2ab \sec \theta \tan \theta) -$
 $(a^2 \tan^2 \theta + b^2 \sec^2 \theta + 2ab \tan \theta \sec \theta)$
 $= a^2 \sec^2 \theta - a^2 \tan^2 \theta + b^2 \tan^2 \theta - b^2 \sec^2 \theta$
 $= a^2 (1) + (b^2) (-1) = a^2 - b^2$

45. a) the numbers divisible by 8,

104, 112, 120, ..., 992

$S_n = 104 + 112 + 120 + \dots + 992, n = \frac{l-a}{d} + 1 \Rightarrow n = 112$

$S_n = \frac{n}{2} (a+l) \Rightarrow S_{112} = 61376$

b) $\frac{x^3-1}{x^2+2} + P(x) = \frac{2x^3-x^2+3}{x^2+2} \Rightarrow P(x) = \frac{2x^3-x^3+3}{x^2+2} - \frac{x^3-1}{x^2+2}$

$P(x) = \frac{2x^3-x^3+3-x^3+1}{x^2+2} = \frac{x^3-x^2+4}{x^2+2}$

Section IV

46 a) Length of tangents = 6.3 (app.)

b)

47. a) solution set $\{-2, 3\}$

b) (i) $k = 15$

(ii) cost of 3 liters milk = Rs. 45

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WAY TO SUCCESS TEAM

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