Exercise 6(A)

1) i) $A_1 = \{x : 2x + 3 = 11\}$

$\therefore 2x + 3 = 11$

$\Rightarrow 2x = 11 - 3$

$\Rightarrow 2x = 8$

$\Rightarrow x = \frac{8}{2}$

$\Rightarrow x = 4$

$\therefore A_1 = 4$

ii) $A_2 = \{x : x^2 - 4x - 5 = 0\}$

$\therefore x^2 - 4x - 5 = 0$

$\Rightarrow x^2 - 5x + x - 5 = 0$

$\Rightarrow x(x-5) + 1(x-5) = 0$

$\Rightarrow (x-5)(x+1) = 0$

$\therefore x - 5 = 0$

$\Rightarrow x = 5$

$x + 1 = 0$

$\Rightarrow x = -1$

$\therefore A_2 = \{5, -1\}$

iii) $A_3 = \{x : x \in Z, -3 \leq x < 4\}$

$\therefore -3 \leq x < 4$

$\Rightarrow x = -3, -2, -1, 0, 1, 2, 3$

$\therefore A_3 = -3, -2, -1, 0, 1, 2, 3$

iv) $A_4 = \{x : x = 4n, n \in W \text{ and } n < 4\}$

iv) $A_4 = \{x : x$ is a two digit number and sum of the digits of x is $7\}$

$\therefore x$ is a two digit number and sum of digits of x is 7

$\Rightarrow x = 16, 25, 34, 43, 52, 61, 70$

$\therefore A_4 = 16, 25, 34, 43, 52, 61, 70$

v) $A_5 = \{x : x = 4n, n \in W \text{ and } n < 4\}$

$\therefore x = 4n$

$n = 0$

$x = 4 \times 0$

$\Rightarrow x = 0$

$n = 1,$

$x = 4 \times 1$

$\Rightarrow x = 4$

$n = 2$

$x = 4 \times 2$

$\Rightarrow x = 8$

$n = 3$

$x = 4 \times 3$

$\Rightarrow x = 12$

$\therefore A_5 = \{0, 4, 8, 12\}$

vi) $A_6 = \{x : x = \frac{n}{n+2} ; n \in N \text{ and } n > 5\}$

$\therefore x = \frac{n}{n+2}$

$n = 6.$

$\Rightarrow x = \frac{6}{6+2}$

$\Rightarrow x = \frac{6}{8}$

$\Rightarrow x = \frac{3}{4}$

$n = 7$

$\Rightarrow x = \frac{7}{7+2}$

$\Rightarrow x = \frac{7}{9}$

$n = 8$

$\Rightarrow x = \frac{8}{10}$

$\Rightarrow x = \frac{4}{5}$

$n = 9$

$\Rightarrow x = \frac{9}{9+2}$

$\Rightarrow x = \frac{9}{11}$

$\therefore A_6 = \frac{3}{4}, \frac{7}{9}, \frac{4}{5}, \frac{9}{11}$

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2) i) $B_1 = \{6, 9, 12, 15, \ldots\}$

$= \{x : x = 3n+3 ; n \in N\}$

ii) $B_2 = \{11, 13, 17, 19\}$

$= \{x : x$ is a prime number between 10 and 20$\}$

iii) $B_3 = \left\{\frac{1}{3}, \frac{3}{5}, \frac{5}{7}, \frac{7}{9}, \frac{9}{11}, \ldots\right\}$

$= \left\{x : x = \frac{n}{n+2}$, where n is an odd natural number$\right\}$

iv) $B_4 = \{8, 27, 64, 125, 216\}$

$= \{x : x = n_3 ; n \in N$ and $2 \leq n \leq 6\}$

v) $B_5 = \{-5, -4, -3, -2, -1\}$

$= \{x : x \in Z, -5 \leq x \leq -1\}$

vi) $B_6 = \{\ldots, -6, -3, 0, 3, 6 \ldots\}$

$= \{x : x = 3n, n \in Z\}$