(v) \{ x : x \text{ is a positive integer which is not divisible by 3 or not divisible by 5} \} \\
(vi) \{ x : x \in \mathbb{N} \text{ and } x \text{ is not a perfect square } \} \\
(vii) \{ x : x \in \mathbb{N} \text{ and } x \text{ is not a perfect cube } \} \\
(viii) \{ x : x \in \mathbb{N} \text{ and } x \neq 3 \} \\
(ix) \{ x : x \in \mathbb{N} \text{ and } x \neq 2 \} \\
(x) \{ x : x \in \mathbb{N} \text{ and } x < 7 \} \\
(xi) \{ x : x \in \mathbb{N} \text{ and } x \leq \frac{9}{2} \}

6. A' is the set of all equilateral triangles.
7. (i) U \hspace{1cm} (ii) A \hspace{1cm} (iii) \emptyset \hspace{1cm} (iv) \emptyset

EXERCISE 1.6

1. 2 \hspace{1cm} 2. 5 \hspace{1cm} 3. 50 \hspace{1cm} 4. 42
5. 30 \hspace{1cm} 6. 19 \hspace{1cm} 7. 25, 35 \hspace{1cm} 8. 60

Miscellaneous Exercise on Chapter 1

1. A \subset B, A \subset C, B \subset C, D \subset A, D \subset B, D \subset C
2. (i) False \hspace{1cm} (ii) False \hspace{1cm} (iii) True \hspace{1cm} (iv) False \hspace{1cm} (v) False
(vi) True
7. False
12. We may take A = \{ 1, 2 \}, B = \{ 1, 3 \}, C = \{ 2, 3 \}
13. 325
14. 125
15. (i) 52, (ii) 30
16. 11

EXERCISE 2.1

1. \( x = 2 \) and \( y = 1 \)
2. The number of elements in \( A \times B \) is 9.
3. \( G \times H = \{ (7, 5), (7, 4), (7, 2), (8, 5), (8, 4), (8, 2) \} \)
(\( H \times G = \{ (5, 7), (5, 8), (4, 7), (4, 8), (2, 7), (2, 8) \} \)
4. (i) False \hspace{1cm} P \times Q = \{ (m, n), (m, m), (n, n), (n, m) \} \\
(ii) True \hspace{1cm} (iii) True
5. \( A \times A = \{ (\pm 1, \pm 1), (-1, 1), (1, -1), (1, 1) \} \)
(\( A \times A \times A = \{ (\pm 1, \pm 1, \pm 1), (-1, -1, 1), (-1, 1, -1), (-1, -1, -1), (1, 1, 1), (1, -1, -1), (1, -1, 1), (-1, -1, 1) \} \)
6. \( A = \{ a, b \}, B = \{ x, y \} \)
8. \( A \times B = \{ (1, 3), (1, 4), (2, 3), (2, 4) \} \)
A \times B will have \( 2^4 = 16 \) subsets.
9. \( A = \{ x, y, z \} \) and \( B = \{ 1, 2 \} \)
10. \( A = \{-1, 0, 1\} \), remaining elements of 
\( A \times A \) are \((-1, -1), (-1, 1), (0, -1), (0, 0), (1, -1), (1, 0), (1, 1)\)

EXERCISE 2.2

1. \( R = \{(1, 3), (2, 6), (3, 9), (4, 12)\} \)
   Domain of \( R = \{1, 2, 3, 4\} \)
   Range of \( R = \{3, 6, 9, 12\} \)
   Co domain of \( R = \{1, 2, ..., 14\} \)

2. \( R = \{(1, 6), (2, 7), (3, 8)\} \)
   Domain of \( R = \{1, 2, 3\} \)
   Range of \( R = \{6, 7, 8\} \)

3. \( R = \{(1, 4), (1, 6), (2, 9), (3, 4), (3, 6), (5, 4), (5, 6)\} \)

4. (i) \( R = \{(x, y) : y = x - 2 \text{ for } x = 5, 6, 7\} \)
   (ii) \( R = \{(5,3), (6,4), (7,5)\} \). Domain of \( R = \{5, 6, 7\} \), Range of \( R = \{3, 4, 5\} \)

5. (i) \( R = \{(1, 1), (1, 2), (1, 3), (1, 4), (1, 6), (2, 4), (2, 6), (2, 2), (4, 4), (6, 6), (3, 3), (3, 6)\} \)
   (ii) Domain of \( R = \{1, 2, 3, 4, 6\} \)
   (iii) Range of \( R = \{1, 2, 3, 4, 6\} \)

6. Domain of \( R = \{0, 1, 2, 3, 4, 5\} \)
   Range of \( R = \{5, 6, 7, 8, 9, 10\} \)

7. \( R = \{(2, 8), (3, 27), (5, 125), (7, 343)\} \)

8. No. of relations from \( A \) into \( B = 2^6 \)

9. Domain of \( R = \mathbb{Z} \)
   Range of \( R = \mathbb{Z} \)

EXERCISE 2.3

1. (i) yes, Domain = \{2, 5, 8, 11, 14, 17\}, Range = \{1\} 
   (ii) yes, Domain = \{2, 4, 6, 8, 10, 12, 14\}, Range = \{1, 2, 3, 4, 5, 6, 7\} 
   (iii) No.

2. (i) Domain = \( \mathbb{R} \), Range = \((-\infty, 0]\) 
   (ii) Domain of function = \{\( x : -3 \leq x \leq 3\}\} 
       Range of function = \{\( x : 0 \leq x \leq 3\}\}

3. (i) \( f(0) = -5 \) \( \quad \) (ii) \( f(7) = 9 \) \( \quad \) (iii) \( f(-3) = -11 \)

4. (i) \( t(0) = 32 \) \( \quad \) (ii) \( t(28) = \frac{412}{5} \) \( \quad \) (iii) \( t(-10) = 14 \) \( \quad \) (iv) 100

5. (i) Range = \((-\infty, 2]\) \( \quad \) (ii) Range = \([2, \infty)\) \( \quad \) (iii) Range = \(\mathbb{R}\)
Miscellaneous Exercise on Chapter 2

2. Domain of function is set of real numbers except 6 and 2.
3. \[ \text{Domain} = \{1, \infty\}, \text{Range} = [0, \infty) \]
4. Domain = \( \mathbb{R} \), Range = non-negative real numbers
5. Range = \([0, 1)\)
6. \((f + g) x = 3x - 2 \quad (f - g) x = -x + 4\)
7. \( \left(\frac{f}{g}\right) x = \frac{x + 1}{2x - 3}, \quad x \neq \frac{3}{2} \)
8. \(a = 2, b = -1\)
9. (i) No (ii) No (iii) No
10. (i) Yes, (ii) No
11. No
12. Range of \(f\) = \{3, 5, 11, 13\}

EXERCISE 3.1
1. (i) \(\frac{5\pi}{36}\) (ii) \(-\frac{19\pi}{72}\) (iii) \(\frac{4\pi}{3}\) (iv) \(\frac{26\pi}{9}\)
2. (i) \(39^\circ 22' 30''\) (ii) \(-229^\circ 5' 27''\) (iii) \(300^\circ\) (iv) \(210^\circ\)
3. \(12\pi\)
4. \(12^\circ 36'\)
5. \(\frac{20\pi}{3}\)
6. \(5 : 4\)
7. (i) \(\frac{2}{15}\) (ii) \(\frac{1}{5}\) (iii) \(\frac{7}{25}\)

EXERCISE 3.2
1. \(\sin x = -\frac{\sqrt{3}}{2}, \cosec x = -\frac{2}{\sqrt{3}}, \sec x = -\frac{2}{\sqrt{3}}, \tan x = \sqrt{3}, \cot x = \frac{1}{\sqrt{3}}\)
2. \(\cosec x = \frac{5}{3}, \cos x = -\frac{4}{5}, \sec x = -\frac{4}{5}, \tan x = -\frac{3}{4}, \cot x = -\frac{4}{3}\)
3. \(\sin x = -\frac{4}{5}, \cosec x = -\frac{5}{4}, \cos x = -\frac{3}{5}, \sec x = -\frac{5}{3}, \tan x = \frac{4}{3}\)
4. \(\sin x = -\frac{12}{13}, \cosec x = -\frac{13}{12}, \cos x = -\frac{5}{12}, \sec x = -\frac{5}{12}, \tan x = -\frac{5}{12}, \cot x = \frac{13}{12}\)