ଉତ୍ତରମାଳା

ଅନୁଶୀଳନୀ - 1(a)

1. (i) (–4, 4), (ii) (0, –2), (iii) $\frac{1}{3}(4y - 1)$, (iv) $2x + 2$, (v) $\left(-\frac{1}{2}, 1\right)$ (vi) $b \neq 0$, (vii) ଅସଙ୍ଗତ (viii) ସଙ୍ଗତ ଓ ଅସ୍ୱତନ୍ତ୍ର (ix) ସଙ୍ଗତ ଓ ସ୍ୱତନ୍ତ୍ର (x) (0, 0)

2. (i) $x + y + 2 = 0$, $x + y = 3 = 0$, (ii) $x + y + 2 = 0$, $x - y = 0$ (iii) $x + y + 2 = 0$, $2x + 3y + 4 = 0$ (iv) 2 (v) 2 : 1 (vi) 1 (vii) $\frac{1-bc}{b-a}$ ଓ $\frac{ca-1}{b-a}$, (viii) 0, 0, (ix) 0 (x) 0, $-\frac{a}{b}, \frac{-2a}{b}$

3. (i) (1, 1), (ii) (1, 1), (iii) (1, 2), (iv) ଦୁଇ, (v) $\frac{x}{0} = \frac{y}{0} = \frac{1}{-2}$ (vi) (0, –1), (–1, 0), (1, –2), (vii) (1, 2), (2, 4), (3, 6), (4, 8) (viii) $\left(\frac{1}{2}, \frac{3}{4}\right), \left(\frac{1}{3}, \frac{2}{3}\right), \left(\frac{1}{4}, \frac{5}{8}\right)$ (ix) b, c, c (x) 3 (xi) 12, (xii) 8, (xiii) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ ଓ $\frac{b_1}{b_2} = \frac{c_1}{c_2}$ (xiv) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (xv) $\pm\sqrt{6}$

4. (i) (4, 3), (ii) (3, 2), (iii) $\left(\frac{1}{2}, \frac{1}{3}\right)$, (iv) (3, –2), (v) $\left(\frac{1}{2}, 1\right)$, (vi) (–b, a + b)

5. (i) (2, –1), (ii) (4, 3), (iii) (3, 5), (iv) (3, 3), (v) $\left(\frac{1}{2}, 1\right)$, (vi) $\left(\frac{bc}{b-a}, \frac{ac}{b-a}\right)$

6. (i) (1, 1), (ii) (2, –3), (iii) $\left(\frac{1}{2}, \frac{1}{3}\right)$, (iv) $\left(-5, \frac{2}{3}\right)$ (v) (18, 15), (vi) (9, 4)

7. (i) $\left(\frac{1}{4}, \frac{1}{3}\right)$, (ii) $\left(\frac{1}{5}, 2\right)$, (iii) (3, –1), (iv) (0, 0) or (3, 4), (v) $\left(a+b, \frac{-2ab}{a+b}\right)$, (vi) (a, b) (vii) (3, 2), (viii) (2, 3), (ix) (3, 2) (x) (2, 6), (xi) (18, 6), (xii) (a, b).

8.15. 9(i) $k \neq -b$ (ii) $k \neq -4$ (iii) $k \neq 6$, 10. (i) $\frac{-9}{4}$ (ii) $\frac{-14}{5}$ (iii) – 15

ଅନୁଶୀଳନୀ - 1(b)

1. (1, 1), 2. (–3, 6), 3. (2, 1), 4. (2, 3), 5. (2, 4), 6. (1, 2), 7. (–1, 2), 8. (1, –3), 9. (6, –3), 10. b ଓ 5 ଏକକ, 11. $a = 7, b = 4$

ଅନୁଶୀଳନୀ - 1(c)

1. 45 ବର୍ଷ ଓ 15 ବର୍ଷ; 2. 12 ଓ 17; 3. 7 ବର୍ଗସେ.ମି.; 4 88 ବ.ସେ.ମି.; 5. 4, 8; 6. 47 ବା 74; 7 $\frac{2}{7}$; 8. 37; 9.253 ବ.ମି.; 10 20 ଦିବ ଓ 30 ଦିନ; 11 12 ଦିନ ଓ 24 ଦିନ; 12. 4 କି.ମି. ଓ 6

କି.ମି.; 13. 6000 ଟଙ୍କା ଓ 5250 ଟଙ୍କା; 14. 140 ଟଙ୍କା ଓ 100 ଟଙ୍କା; 15. $3\frac{1}{3}$ ଓ 5 କି.ମି.; 16. $\frac{7}{9}$; 17. 40 ବ. ଓ 10 ବ.; 18. ଘଣ୍ଟାପ୍ରତି 40 କି.ମି. ଓ 30 କି.ମି.; 19. 89 କିମ୍ବା 98; 20. 20,30; 21. (i) 60^0, 30^0, 90^0 (ii) 60^0, 20^0, 100^0; 22. 180 ଟଙ୍କା ଓ 1400 ଟଙ୍କା।

ଅନୁଶୀଳନୀ - 2(a)

1. (i) d, (ii) a, (iii) c, (iv) d, (v) a, (vi) c

2. (i) c = –16, (ii) 3, (iii) –3, 2 (iv) $\frac{25}{4}$ (v) 0, 3) (vi) $-\frac{1}{p}$

3. (i) 3, –2, (ii) 4, $\frac{1}{2}$ (iii) $1+\sqrt{3}$, $1-\sqrt{3}$, (iv) –2p, 3q, (v) $-\frac{3}{2}$, $-\frac{1}{3}$, (vi) $\frac{5}{3}$, $\frac{3}{2}$ (vii) $\frac{1}{3}\left(16+\sqrt{110}\right)$, $\frac{1}{3}\left(16-\sqrt{110}\right)$, (viii) $-\frac{4\sqrt{3}}{3}$, $-2\sqrt{3}$, (ix) $\frac{1}{10}\left(19+\sqrt{21}\right)$, $\frac{1}{10}\left(19-\sqrt{21}\right)$, (x) $\frac{13}{\sqrt{7}}$, $-\sqrt{7}$, (xi) $\frac{-3+\sqrt{2}}{5}$, $\frac{-3-\sqrt{2}}{5}$, (xii) $\frac{26}{a}$, $\frac{26}{3a}$

4. (i) $\frac{-a\pm\sqrt{a^2-4b}}{2}$ (ii) –a, a – b

5. (i) $\frac{1}{2}$, 2 (ii) $-\frac{5}{6}$, 2 (iii) 3, 0 (iv) $\pm\frac{5}{2}$, (v) $-\frac{3}{2}$, $-\frac{1}{3}$, (vi) $\sqrt{2}$, 1, (vii) a, $\frac{1}{a}$, (viii) $\frac{7}{5}$, $-\frac{4}{3}$, 6. 4, 9. 2

ଅନୁଶୀଳନୀ - 2(b)

1. (i) $x = t^2$, (ii) $t = 2^x$ ରୂପେ $x^2 - 2x + 1 = 0$
   (iii) $t = x^2 + 3x + 2$ ରୂପେ $t^2 - 8t + 12 = 0$
   (iv) $t = \sqrt{x+9}$ ରୂପେ $t^2 - t - 12 = 0$
   (v) $n(n+1) = 240 \Rightarrow n^2 + n - 240 = 0$
   (vi) $x(x-5) = 150 \Rightarrow x^2 - 5x - 150 = 0$
   (vii) $x^2 - 18x + 56 = 0$

2. (i) $\pm2, \pm\frac{1}{2}\sqrt{5}$, (ii) $\pm1, \pm\frac{\sqrt{3}}{\sqrt{2}}$, (iii) $\pm\frac{1}{2}$, $\pm2\sqrt{2}$, (iv) ±1, $\pm\frac{1}{2}$, (v) $\frac{1}{4}$, $\frac{5}{12}$, (vi) ±2, ±3, (vii) 0, 1, –3, –4, (viii) 0, 2 (ix) 0, 2, 4, $\frac{2}{5}$, (x) $-\frac{3}{4}$, $\frac{-3}{2}$ (xii) 2, $\frac{1}{2}$, (xiii) 8 (xiv) 6

3. (i) 0 କିମ୍ବା 1 (ii) 19, 20 (iii) 5, 6 (iv) $\frac{1}{25}$, (v) 4 କିମ୍ବା $\frac{1}{4}$ (4) 8 କି.ମି. ପ୍ରତି ଘଣ୍ଟା; 5, 10; (6) 6, 9; (7) 15 ସେ.ମି., 8 ସେ.ମି.; (8) 27; (9) 3 କି.ମି. ପ୍ରତି ଘଣ୍ଟା; (10) 15 ମି., 22 ମି.; (11) 5 କି.ମି./ଘଣ୍ଟା; (12) 100; (13) 36; (14) 2 ମି.

ଅନୁଶୀଳନୀ - 3(a)

1. (i) $\left(\frac{3}{2}\right)^4$, (ii) $\left(-\frac{3}{5}\right)^3$, (iii) $(0.01)^4$, (iv) $(0.5)^{100}$, (v) $\left(\frac{1}{3.7}\right)^m$ ବା $(3.7)^{-m}$

2. (i) ✓ (ii) × (iii) × (iv) × (v) ✓ (vii) ✓ (viii) ✓ (ix) ×
(x) ✓ (xi) × (xii) × (xiii) × (xiv) × (xv) ×

3. (i) 8 (ii) –4 (iii) –5 (iv) –3 (v) –3 (vi) 3, 125

4. (i) $\frac{1}{6^4}$ (ii) 2^3 (iii) 8^3 (iv) x^{10} (v) $\frac{2}{C^m}$

5. (a) (iv) (b) ସମୀକରଣ - (ii) ଓ (iii), ଅଭେଦ : (i) ଓ (iv) 6. 4

7. (i) 3^{-2}, (ii) 12^5, (iii) 3^{-3}, (iv) 108^{-4}, (v) $\left(\frac{3}{2}\right)^{-3}$ ବା $\left(\frac{2}{3}\right)^3$, (vi) $\left(\frac{3}{4}\right)^{2m+5}$, (vii) $\left(\frac{a}{b}\right)^2$,
(viii) $\left(\frac{2}{3}\right)^{16}$, (ix) $\left(-\frac{3}{5}\right)^9$, (x) $\left(\frac{3}{4}\right)^{-3}$ ବା $\left(\frac{4}{3}\right)^3$

8. (i) 0.01, (ii) $\frac{125}{8}$, (iii) 720, (iv) $\frac{3}{2}$, (v) 1 (vi) 1 (vii) $\frac{3}{2}$

9. (i) $\frac{1}{2}$, (ii) $\frac{3}{2}$, (iii) $\frac{1}{3}$, (iv) $\frac{256}{9}$, (v) 2, (vi) 100, (vii) $\frac{1}{32}$, (viii) $\frac{2}{9}$

10. (i) $\frac{1}{0.6}$, (ii) (a) 2^{-3}, (b) $(-3)^2$ (c) $(-3)^2$ (iii) 2^{20} (iv) 5^3, (v) (b)

11. (i) $\frac{3^7}{4}$, (ii) $\frac{5^7}{4}$, (iii) 1, (iv) 1, 14. 1, 15. 4

ଅନୁଶୀଳନୀ - 3(b)

1. (i) 10, (ii) 3, (iii) $\frac{2}{\sqrt[5]{x^4}}$

2. (i) $\sqrt[4]{a^3}$, (ii) $\frac{1}{a^4}$, (iii) $\frac{1}{\sqrt{a^7}}$, (iv) a^5, (vi) $\frac{1}{\sqrt[7]{x^5}}$, (vi) $\frac{1}{2}\sqrt[5]{x^2}$

3. (i) $a^{\frac{5}{3}}$, (ii) $\frac{1}{\frac{1}{2}}$, (iii) $\frac{1}{2}x^{\frac{3}{5}}$, (iv) $\frac{3}{a^2}$, (v) $\frac{2}{5}x^{\frac{3}{2}}$

4. (i) $\sqrt[5]{a}$, (ii) $\sqrt[x^2]{10^4}$, (iii) $2\sqrt[5]{a^{-11}}$, (iv) $\sqrt[3]{3^{-1}}$, 5. –1

6. (i) 16, (ii) 32, (iii), 625, (iv) $\frac{1}{3}$, (v) $\frac{1}{2}$, (vi) $\frac{1}{27}$, (vii) 243, (viii) 36, (ix) $\frac{1}{625}$, (x) $\frac{16}{81}$

7. (i) 2, (ii) 2, (iii) a, (iv) 3, (v) 8, (vi) 81, (vii) $\frac{1}{2}$, (viii) $\frac{a}{\sqrt[3]{b}}$

8. $\sqrt[4]{4} < \sqrt[3]{3}$

9. (i) a – b, (ii) 1 – a, (iii) 1 – a, (iv) x + y (vi) $x^{-2} + x^{-1}y^{-1} + y^{-2}$

10. (i) $x^{-\frac{1}{6}}y^{-\frac{1}{9}}z^{-\frac{2}{9}}$, (ii) $xy^{\frac{1}{3}}z^{-\frac{1}{6}}$ (iii) $a^{-\frac{1}{2}}.b^{\frac{5}{6}}.c^{\frac{29}{24}}$

ଅନୁଶୀଳନୀ - 3(c)

1. (ii) 3 ଓ 2.

2. (i) –2, (ii) 0, (iii) $\frac{1}{2}$

3. (i) 2, (ii) $\frac{3}{2}$, (iii) –4 4.

4. (i) 2, (ii) 3, (iii) –4

5. (i) 4, (ii) –5, (iii) –4, (iv) $\frac{1}{4}$, (v) 15, (vi) 3, (vii) 1, (viii) 2

6. (i) x = 4, y = 3, (ii) x = 2, y = 1, (iii) x = 3, y = 1, (iv) x = 2, y = 3.

ଅନୁଶୀଳନୀ - 3(d)

1. (i) $\log_5 125 = 3$ (ii) $\log_4 64 = 2$ (iii) $\log_{15} 225 = 2$ (iv) $\log_{16} 8 = \frac{3}{4}$

   (v) $\log_{36} 6 = \frac{1}{2}$ (vi) $\log_3 \frac{1}{9} = -2$ (vii) $\log_9 \frac{1}{27} = \frac{-3}{2}$ (viii) $\log_{10} 150 = x$

   (ix) $\log_x y = 3$ (x) $\log_{10}(0.01) = -2$ (xi) $\log_{\sqrt{2}} 8 = 6$ (xii) $\log_2 \frac{1}{9} = -2$

2. (i) $5^2 = 25$ (ii) $10^3 = 1000$ (iii) $11^3 = 1331$ (iv) $\sqrt{2}^4 = 4$

   (v) $(0.5)^3 = 0.125$ (vi) $\left(\frac{2}{3}\right)^2 = \frac{4}{9}$ (vii) $10^{-2} = .01$ (viii) $(10)^{-4} = .0001$

3. (i) 1 (ii) 2 (iii) 5 (iv) 2 (v) 2 (vi) 1 (vii) 0 (viii) 1

4. (i) 3 (ii) 2 (iii) 27 (iv) 25 (v) 2 (vi) 5 (vii) 2 (viii) a (a > 0, a ≠ 1)

5. (i) F (ii) F (iii) T (iv) T (v) T (vi) F (vii) F

ଅନୁଶୀଳନୀ - 3(e)

1. (i) $3\log_a 3$ (ii) $3\log_a 2 + \log_a 7$ (iii) $3\log_a 2 - 2\log_a 3$ (iv) $5\log_a 3$
   (v) $\log_a 3 + \log_a 5 + \log_a 7$ (vi) $2\log_a 2 + 3\log_a 3$
   (vii) $2\log_a 2 - 3\log_a 3$ (viii) $2\log_a 5 - \log_a 2 - 2\log_a 7$
   (ix) $\log_a 3 - \log_a 2 - \log_a 5$ (x) $-2\log_a 5$
2. (i) $\log_a 25$ (ii) $\log_a 9$ (iii) $\log_a 5$ (iv) $\log_a 9$ (v) $\log_a 8$ (vi) $\log_a \frac{1}{2}$
   (vii) $\log_a x^6$ (viii) $\log_a(xy^2)$ (ix) $\log_a \frac{1}{x}$ (x) $\log\left(\frac{y}{x}\right)^3$
3. (i) $\log_a 1000$ (ii) $\log_a 80$ (iii) $\log_a 5$ (iv) $\log_a 36$ (v) $\log_a 2$
   (vi) $\log_a\left(\frac{x^3y^2}{z}\right)$ (vii) $\log_a(xy^2)$
4. (i) $a^2 = xy$ (ii) $a^3 = mn^2$ (iii) $a^2 6^y = 5^x$ (iv) $a^{-1} = 2^x$ (v) $x^x y^y z^z = 1$
5. (i) 3 (ii) 16 (iii) 3 (iv) 1
6. (i) $\log_a 2$ (ii) 1 (iii) $\log_a 30$ (iv) $\frac{4}{3}$
7. (i) $\frac{3}{4}$ (ii) $\frac{5}{2}$ (iii) -4 13. 0.25 14. 8

ଅନୁଶୀଳନୀ - 3(f)

1. (i) 4 (ii) $\frac{1}{2}$ (iii) -4 (iv) $-\frac{1}{2}$ (v) 100 (vi) 25
2. (i) 1·3010 (ii) 2·4771 (iii) 3·8451 (iv) −1·3010 (v) −0·4771
   (vi) −1·8451 (vii) −2·9586 (viii) −2·9586 (ix) 0·5441
   (x) −2·0758 (xi) 0·04771 (xii) 1·8865
3. (i) $7{\cdot}6085 \times 10^4$, 4 (ii) $3{\cdot}123 \times 10^3$, 3 (iii) $5{\cdot}77275 \times 10^{-1}$, −1
   (iv) $2{\cdot}3 \times 10^{-4}$, −4 (v) $1{\cdot}986 \times 10^2$, 2 (vi) $1{\cdot}0 \times 10^0$, 0 (vii) $2{\cdot}902 \times 10^{-3}$, −3
   (viii) $3{\cdot}010 \times 10^{-2}$, −2 (ix) $1{\cdot}42857 \times 10^3$, 3 (x) $2{\cdot}942 \times 10^2$, 2
4. (i) 1 (ii) ଧନାତ୍ମକ ପୂର୍ଣ୍ଣସଂଖ୍ୟା (iii) −3 (iv) 0·032 (v) 3·3010
5. (i) 2.0294 (ii) 2.6031, (iii) 0.4011, (iv) $\bar{1}.5386$, (v) $\bar{5}.7614$
7. 0.10034

ଅନୁଶୀଳନୀ - 3(g)

1. (i) 100 (ii) 3 (iii) 5
2. (i) T (ii) T (iii) F (iv) F
3. (i) $-3 + 0.2639$ (ii) $-1 + 0.379$ (iii) $6 + 0.732$ (iv) $-4 + 0.2639$ (v) $-2 + 0.6257$
4. (i) 44.11 (ii) 0.04411 (iii) 0.004411
5. (i) 0.000251 (ii) 2.51 (iii) 251, (iv) 0.251
6. (i) 2.413 (ii) 79.12 (iii) 0.04023 (iv) 0.04023
7. (i) 260 (ii) 0.1440 (iii) $\bar{1}.4412$ (iv) 8964 (v) 10.17

ଅନୁଶୀଳନୀ - 3(h)

1. 3, 6, 5
2. (i) 1.467 (ii) 1.25 (iii) 1.59 (iv) 1.77 (v) 3
3. 17.7 ବର୍ଷ 4. 22.5 ବର୍ଷ 5. 6.868×10^6
6. (i) 0.3794 (ii) 1.233 (iii) 4.641 (iv) 20.63 (v) 261.0 (vi) 0.817 (vii) 0.2952
7. 7.725 ବ.ସେ.ମି. 8. 43.30 ବ.ସେ.ମି.

ଅନୁଶୀଳନୀ - 4(a)

1. T : (i), (ii), (iv), (viii); 2. (i)(B) 60, (ii) (B) $10\frac{1}{2}$, (iii) (C) $\frac{n+1}{2}$, (iv) (B) m+2, (v) (B) 2m, (vi) (B) $\frac{12a+10b}{a+b}$, (vii) (C) 1000, (viii) (C) 12, (ix) (A) 0, (x) (B) x+4, 3. 42.4; 4. 29.2; 5. 4.17 ଗ୍ରାମ୍; 6. 42.4; 7. 14.7; 8. 49.6 ସେ.ମି.; 9. 261.00; 10. 103.5; 11 12.24; 12.151; 13. 20; 14. 75.18; 15. n = 30, m = $\frac{17}{3}$; 17. 40

ଅନୁଶୀଳନୀ - 4(b)

1. T : (iii), (iv), (vi); 2. (a) 47, (b) 61.5, (c) 16, (d) 29, 3. 8; 4. 4; 5. 7; 6 (i) 25, (ii) 17.5; 7. (i) 28.0 ପ୍ରାୟ, (ii) 30.0 ପ୍ରାୟ; 8 166.3; 9. 15.10; 10 (i) 52.5, (ii) 140

ଅନୁଶୀଳନୀ - 4(c)

1. T : (i); 2. (i) 9, (ii) 22, 24, (iii) 18, (iv) 10, 11, 3 (i) 8, (ii) 22, 24. 4. (i) 7, (ii) 35.2 ଗ୍ରାମ୍, (iii) 8.

ଅନୁଶୀଳନୀ - 5(b)

1. (i) 5, (ii) 11, (iii) 30, (iv) 42, (v) 73, (vi) 118
2. (i) 1 0 0 0 1 1, (ii) 1 0 1 0 0 0, (iii) 1 0 0 0 0 0 0, (iv) 1 0 1 1 1 0 1, (vi) 1 1 0 0 1 0 0
3. (i) 111, (ii) 1000, (iii) 1011, (iv) 1110, (v) 101010, (vi) 100, (vii) 11, (viii) 110, (ix) 10011, (x) 1010
4. (i) 110, (ii) 100100, (iii) 1001110, (iv) 111010001, (v) 10010011, (vi) 10, (vii) 101, (viii) 100, (ix) 110, (x) 101
5. (i) 10000, (ii) 11011, (iii) 100, (iv) 100100, (v) 11101100, (vi) 10101, (vii) 110, (viii) 100
6. (i) 10, (ii) 1000, (iii) 1111, (iv) 101, (v) 101

ଅନୁଶୀଳନୀ - 6(a)

1. 100 ଟ.; 2. 500 ଟ.; 3. 2 ଥର; 4. 5 ଟ.; 5. (i) Nil, (ii) ଟ.22.92, (iii) ଟ.22.92; 6. ଟ.129.12; 7. ଟ.17.09; 8. 144.58; 9. 4.5%; 10. 293.001

ଅନୁଶୀଳନୀ - 6(b)

1. 300, 2. 960, 3. 1000; 4. $\frac{75}{4}$%; 5. 20,100; 6. 1650,120; 7. 50 ଟ., 6% ପ୍ରିମିୟମ୍; 8. ପ୍ରଥମ; 9. 2.75%; 10. 27608.001

ଅନୁଶୀଳନୀ - 7(a)

1. T – (i), (ii), (iii), (vii), (ix), (x), (xiii); 2. (i) d, (ii) b, (iii) d, (iv) a, (v) b; 3. 16 ସେ.ମି.; 4. 15 ସେ.ମି.; 9. 90^0; 12. $4\sqrt{6}$ ସେ.ମି.; 13. 6 ସେ.ମି.; 14. $6\sqrt{3}$ ସେ.ମି.; 25 (ii) $4\sqrt{15}-6\sqrt{5}$ ସେ.ମି.

ପ୍ରଶ୍ନମାଳା - 7(b)

1. T – (i), (vi), (vii), (viii), (x), (xiii); 2. (i) 180, (ii) 120^0, (iii) 72^0, (iv) $\angle AOB$, (v) 180^0, (vi) $\sqrt{2}:1$, (vii) 50^0, (viii) ବ୍ୟାସ; (ix) 30^0 (x) $\overset{\frown}{BCD}$; 3. (i) $\overset{\frown}{BAC}$ ଓ $\overset{\frown}{BFC}$, (ii) $\overset{\frown}{BCA}$ ଓ $\overset{\frown}{BEA}$, (iii) $\angle AOB$, (iv) ସମଦ୍ୱିବାହୁ Δ, (v) ଅସଂଖ୍ୟ, ହଁ, ନା; 4. (i) $m\angle AOB = m\angle COD$

$= 110^0$, $m\angle AOD = m\angle BOC = 70^0$, $m\angle OAB = m\angle OBA = m\angle OCD = m\angle ODC = 35^0$, $m\angle OAD = m\angle ODA = m\angle OBC = m\angle OCB = 55^0$, $m\angle OAB = m\angle ABC = m\angle BCD = m\angle CDA = 90^0$, (ii) 70^0, 110^0, 70^0, (iii) ଆୟତ ଚିତ୍ର; 5. (i) $37\frac{1}{2}^0$, (ii) $37\frac{1}{2}^0$, (iii) ସମାନ୍ତର; 8. 35^0; 10. 70^0.

ପ୍ରଶ୍ନମାଳା - 8

1. (i); 8 (ii); 13. (iii) 50^0, (iv) 4, (v) 18, (vi) 40^0, (vii) 6, (viii) 3, (ix) 1, (x) ଅନ୍ତର; 2. T– (i), (ii), (iv), (vi); 3. ଅର୍ଦ୍ଧବୃତ୍ତ - $\overset{\frown}{AXB}$, $\overset{\frown}{APB}$, କ୍ଷୁଦ୍ରଚାପ - $\overset{\frown}{AYP}$, $\overset{\frown}{APQ}$, $\overset{\frown}{PZQ}$, $\overset{\frown}{QUB}$, $\overset{\frown}{PQB}$, ବୃହତ୍‌ଚାପ - $\overset{\frown}{ABP}$, $\overset{\frown}{AXQ}$, $\overset{\frown}{PAQ}$, $\overset{\frown}{QAB}$, $\overset{\frown}{PAB}$, ସେମାନଙ୍କର ଡିଗ୍ରୀ ପରିମାପ ଯଥାକ୍ରମେ 180^0, 180^0; 60^0, 150^0, 90^0, 30^0, 120^0; 300^0, 210^0, 270^0, 330^0, 240^0; 4. (v) 12 ସେ.ମି., (vi) $4\sqrt{10}$, (vii) 55^0; 5. (i) 35^0, 40^0, 70^0, 75^0, (iii) 10 ସେ.ମି., (iv) 12 ସେ.ମି., (v) 12 ସେ.ମି.; 6. $m\angle AXB = 119^0$, $m\angle AYB = 61^0$।

ଅନୁଶୀଳନୀ - 9(a)

1. (a) (i) $67\frac{6}{7}$ ସେ.ମି., (ii) 17.6 ସେ.ମି., (iii) 88 ସେ.ମି., (iv) 26.4 ସେ.ମି.; (b) (i) $5\frac{5}{9}$ ସେ.ମି., (ii) $166\frac{2}{3}$ ସେ.ମି., (iii) 4 ସେ.ମି., (iv) 2.5 ସେ.ମି.

2. 39380 କି.ମି. 3. 140ଟି 4. 7 ମି. 5. 264 ମି, 220 ମି. 6. 7 ସେ.ମି.
7. $5\sqrt{10}$ ମି. 8. 250 ଥର 9. 6336 ମି. 10. 88 ମି., 22 ମି. 11. 112 ମି.
12. 8 ମି. 48 ସେ. 13. 28 ମି. 14. 55 ସେ.ମି. 15. 63 ଡେ.ମି. 16. $a = \pi\sqrt{2}$
17. 62.8 ସେ.ମି. 18. $88\sqrt{3}$ ସେ.ମି., $44\sqrt{3}$ ସେ.ମି.
19. (a) 36 ସେ.ମି., (b), 24 ଡେ.ମି., (c) 160 ମି,
20. (a) 60^0, (b) 20 ସେ.ମି.; 21. (a) 60^0, (b) 4.4 ସେ.ମି., (c) 63 ସେ.ମି., (d) $\frac{360Y}{2\pi Z}$
22. 17.854 ସେ.ମି.; 23. 3:2; 24. 14 ସେ.ମି.; 25. 120^0, 26. 40 ସେ.ମି.; 27. $2\sqrt{3}$ ସେ.ମି.।

ଅନୁଶୀଳନୀ - 9(b)

1.(i) 3118.5 ବ.ମି., (ii) 9856 ବ.ସେ.ମି., (iii) 6506.5 ବ.ସେ.ମି., (iv) 616 ବ.ମି.; 2. (i) 14 ମି., (ii) 308 ମି.; 3. 70 ସେ.ମି.; 4. $2 : \sqrt{\pi}$; 5. 15 ସେ.ମି.; 6. 2 ଏକକ; 7. (i) $2\sqrt{\frac{x}{\pi}}$ ଏକକ, (ii) $\sqrt{\frac{2x}{\pi}}$ ଏକକ, (iii) $\sqrt{\frac{3x}{\pi}}$ ଏକକ; 8. $\frac{\sqrt{c}}{2}$ ଏକକ; 9. $\frac{\sqrt{c}}{2}$ ଏକକ; 10. 7546 ବ.ସେ.ମି.; 11. 308 ବ.ମି.;

12. 79.92 ଟଙ୍କା; 13. 1078 ବ.ସେ.ମି.; 14. 4 ମି; 15. 512 ଟଙ୍କା; 16. 21 ସେ.ମି., 14 ସେ.ମି.; 17. 616 ବ.ସେ.ମି.; 18. 1.54 ଏୟର; 19. 550 ବ.ସେ.ମି.; 20 1589 ଟଙ୍କା; 22 616 ବ.ସେ.ମି.; 23. $42\sqrt{3}$ ସେ.ମି.; 24. (i) $821\frac{1}{3}$ ବ.ସେ.ମି., (ii) $2200.\frac{11}{12}$ ବ.ମି.. (iii) 1134 ବ.ମି., (iv) 1782ବ.ମି.; 25. (i) 42 ମି., (ii) 80 ମି..; 26.(i) 70°, (ii) 135°, (iii) 60°; 27. 3 ବ.ସେ.ମି.; 28.(i) 1000 ବ.ମି., (ii) 600 ବ.ସେ.ମି.; 29. 14 ମି.; 30. 7.84 ବ.ସେ.ମି.; 31. (i) 9 ଏକକ, (ii) 3:2 ।

ଅନୁଶୀଳନୀ - 9(c)

1.(a) 480 ବ.ସେ.ମି., 528 ବ.ସେ.ମି., (b) 128 ବ.ମି., 152 ବ.ମି.; 2. (a) 6828 ବ.ମି., 8428 ବ.ମି., (b) 720 ବ.ଡ଼େ.ମି., 907.056 ବ.ଡ଼େ.ମି.; 3. 20 ସେ.ମି., 1008 ବ.ସେ.ମି.; 4. 3 ସେ.ମି.; 5. 1056 ବ.ମି.; 6. 20 ସେ.ମି., 21 ସେ.ମି.; 7.(a) 180 ବ.ମି., (b) 1150 ବ.ସେ.ମି., (c) 10 ମି.; 8 2592 ବ.ସେ.ମି.; 9. 233 ଟଙ୍କା; 10. 36 ମି, 30 ମି., 24 ମି.; 11. 16 ମି., 14 ମି.; 12. 235 ଟଙ୍କା; 13 2680 ବ.ସେ.ମି.; 14. 20 ସେ.ମି., 10 ସେ.ମି., 5 ସେ.ମି.; 15. 275 ଟଙ୍କା; 16 2.5 ମି., 1.5 ମି.; 17 (a) 200 ବ.ମି., (b) 72 ବ.ମି., (c) 2904 ବ.ମି., (d) 15 ମି.; 18. 6 ସେ.ମି.; 19. 40 ମି.; 20. 15 ସେ.ମି.; 21. 20 ସେ.ମି., 15 ସେ.ମି.; 22. $\frac{28\sqrt{3}}{3}$ ମି.; 23. (a) 1056 ବ.ସେ.ମି., (b) 21 ମି., (c) 7524 ବ.ସେ.ମି., 24. 750 ଥର; 25. $2\frac{1}{3}$ ମି.; 26. 30 ମି.; 27. 2 ସେ.ମି.।

ଅନୁଶୀଳନୀ - 9(d)

1. 6300 ଘ.ମି.; 2. 448 ଘ.ସେ.ମି.; 3. 30 ମି., 1680 ବ.ମି.; 4. 6 ସେ.ମି., 8 ସେ.ମି.; 5. 8 ମି.; 6. 84 ବ.ମି.; 7. $4\sqrt{3}$ ସେ.ମି.; 8. 42 ସେ.ମି., 42 ସେ.ମି.; 9. $360\sqrt{3}$ ବ.ମି.; 10. 1280 ଘ.ମି.; 11 3.125 ଘ.ମି.; 12. $1\frac{2}{3}$ ମି.; 13. 31250 ଖଣ୍ଡ; 14. 1332 ବ.ମି.; 15. 4456 ଘ.ସେ.ମି.; 16. 6 ମି.; 17. 12 ମି., 16 ମି.; 18. 6 ମି., 8 ମି.; 19. 14 ମି.; 20 14 ଡେ.ମି.; 21. $2\frac{3}{4}$ ମି.; 22 21 ସେ.ମି.; 23 385 ବ.ଡେ.ମି.; 24. 1386 ଘ.ସେ.ମି.; 25 $\frac{1}{6}$ ସେ.ମି.. 26. 5.04 ମି.; 27 3234 ଘ.ସେ.ମି.; 28. 15 ସେ.ମି., 13 ସେ.ମି.।

ଅନୁଶୀଳନୀ - 11.(a)

1. (i) secB, cosecB, (ii) sec B, cosecB, (iii) cos A, (iv) $\sqrt{2}\sin A$, (v) $\sin(\alpha-\beta)$, (vi) $\cos(\alpha-\beta)$, (vii) cos (A – B)

6. $\frac{\sqrt{3}+1}{2\sqrt{2}}, \frac{\sqrt{3}+1}{2\sqrt{2}}$, 7. $\frac{672}{697}, \frac{185}{697}$, 8. $\frac{-36}{325}, \frac{323}{325}$

ଅନୁଶୀଳନୀ - 11.(b)

1. (a) $\cos 10^0$ (b) $\sin 25^0$, (c) 0, (d) 0, (e) 0, (f) 0, (g) $\sin 180^0$, (h) 0, (i) 0, (j) 0

2. (i) ରୁ (x) ପର୍ଯ୍ୟନ୍ତ ପ୍ରତ୍ୟେକର ସରଳୀକୃତମାନ 1

3. (i) 0, (ii) 1, (iii) 1, (iv) 1, (v) 1, (vi) 1

4. (i) $\frac{1}{\sqrt{3}}$, (ii) 1, (iii) 1, (iv) 1, (v) $\frac{1}{2}$, (vi) o; 5. (i) 1, (ii) 1

7. (i) $A = 90^0$, $B = 45^0$, (ii) $A = 90^0$, $B = 60^0$, (iii) $A = 45^0$, $B = 15^0$, (iv) $A = 90^0$, $B = 45^0$

ଅନୁଶୀଳନୀ - 11.(c)

1. 69.28 ମି., 2. 46.76 ମି., 3. 15.86 ମି., 4. 6 ମି., 5. 22.3 ମି., 6. 25.98 ମି., 7. 200 ମି., 8. 56.78 ମି., 9. $10\sqrt{2}$ ମି., $20\sqrt{2}$ ମି., 10. 22.5 ମି., 11. 27.32 ମି., 12. 27.71 ମି., 13. 81.96 ମି., 14. $3\sqrt{2}$ ମି., $6\sqrt{2}$ ମି., 15. 21.96 ମି., 16. 20.78 ମି.।