

ଉତ୍ତରମାଳା

ଅନୁଶୀଳନୀ - 1(a)

1. (i) $(-4, 4)$ (ii) $(4, 2)$, (iii) $(0, -2)$, (iv) $4y-1$, (v) $2x+2$, (vi) $\frac{1}{2}(x+3)$; 2. ଅନନ୍ୟ ସମାଧାନ: (i), (v); ଅସଂଖ୍ୟ ସମାଧାନ: (ii), (iv); ସମାଧାନ ଅସମ୍ଭବ : (iii), (vi); 4. (i) $2:1$, (ii) 1 , (iii) 3 , (iv) 12 , (v) $\pm\sqrt{6}$; 5. (i) $x=2, y=2$, (ii) $x=1, y=1$, (iii) $x=-1, y=1$, (iv) $x=1, y=1$, (v) $x=-1, y=-1$, (vii) $x=1, y=4$, (viii) $x=7, y=-6$, (ix) $x=3, y=2$, (x) ସମାଧାନ ଅସମ୍ଭବ, (xi) $x=1, y=-4$, (xii) $x=1, y=1$; 6. (iv) $-1, \frac{1}{2}$; 7. (i) $k \neq -6$, (ii) $k \neq -3$, (iii) $k \neq \frac{36}{5}$, (iv) $k \neq 6$, (v) $k \neq \frac{-2}{3}$ (vi) $k \neq 6$; 8. (i) $k=15$, (ii) $k=16$, (iii) $k=\frac{8}{3}$ (iv) $k=9$, (v) $k=\frac{3}{2}$, (vi) $k=\frac{-8}{3}$; 9. (i) $k=16$, (ii) $k=-15$, (iii) $k=2$, (iv) $k=3$, (v) $k=16$, (vi) $k=\frac{-9}{4}$

ଅନୁଶୀଳନୀ - 1(b)

1. (i) $(5, 3)$ (ii) $(3, -2)$, (iii) $(1, 2)$, (iv) $(2, -3)$, (v) $(1, -1)$, (vi) $(-b, a+b)$; 2. (i) $(4, 1)$ (ii) $(2, 1)$, (iii) $(-\frac{1}{3}, -1)$, (iv) $(5, -3)$, (v) $(0, 0)$, (vi) $(\frac{bc}{b-a}, \frac{ac}{b-a})$; 3. (i) $(3, -2)$, (ii) $(3, -1)$, (iii) $(-5, \frac{2}{3})$, (iv) (a^2, b^2) , (v) $(2, -3)$, (vi) $(9, 4)$; 4. (i) $(\frac{1}{4}, \frac{1}{3})$, (ii) $(\frac{41}{25}, \frac{68}{41})$, (iii) $(3, -1)$, (iv) $(3, 4)$, (v) $(a+b, \frac{-2ab}{a+b})$, (vi) (a, b) , (vii) $(3, 2)$, (viii) $(2, 3)$, (ix) $(3, 2)$, (x) $(2, 6)$, (xi) $(18, 6)$, (xii) (a, b) ; 5. (i) -30 , (ii) 7 , (iii) -20 , (iv) $\frac{-13}{20}$; 6. (i) $(1, 1)$, (ii) $(1, 2)$, (iii) $(1, 1)$, (iv) $(2, 1)$

ଅନୁଶୀଳନୀ - 1(c)

1. 90, 47; 2. 4.5 ସେ.ମି.; 3. 88 ବ.ସେ.ମି.; 4. 24, 5. 63 ବା 36; 6. 5 ବା 3; 7. 37; 8. 12, 17; 9. $\frac{7}{9}$, 10. $\frac{12}{25}$; 11. $\frac{3}{2}$ ଟଙ୍କା, $\frac{1}{2}$ ଟଙ୍କା; 12. 36 ବର୍ଷ, 12 ବର୍ଷ; 13. ଦୈନିକ 17 ସେ.ମି. ଓ ପ୍ରସ୍ତ 9 ସେ.ମି.; 14. 20 ଦିନ ଓ 30 ଦିନ, 15. 12 ଦିନ ଓ 24 ଦିନ; 16. 6000 ଟଙ୍କା ଓ 5250 ଟଙ୍କା; 17. 40 ବର୍ଷ ଓ 10 ବର୍ଷ; 18. 253 ବ.ମି.; 19. 20, 30; 20. $\frac{2}{7}$.

ଅନୁଶୀଳନୀ - 2(a)

1. (i) ମୂଳଦୁଇ ବାସ୍ତବ ଓ ଅଭିନ୍ନ । (ii) ପ୍ରଭେଦକ 1 ଅଟେ ।
 (iii) ମୂଳଦୁଇର ସମଷ୍ଟି $-\frac{b}{a}$ (iv) ମୂଳଦୁଇର ଗୁଣଫଳ $\frac{c}{a}$
 (v) 1 ଓ -1 ମୂଳ ବିଶିଷ୍ଟ ଦ୍ଵିଘାତ ସମୀକରଣଟି $x^2 - 1 = 0$
 (vi) $x^2 = 0$ ସମୀକରଣର ମୂଳ ସମାନ ଅଟନ୍ତି ।
 (vii) ମୂଳଦୁଇର ସମଷ୍ଟି $\frac{2}{3}$ (viii) ମୂଳଦୁଇର ଗୁଣଫଳ $-\frac{1}{3}$
2. (i) $x^2 + 2x - 15 = 0$, (ii) $m = -1$ (iii) $p = 3$, (iv) $c = \frac{1}{4}$ (v) $k = -16$, (vi) 5 , (vii) $2\sqrt{6}$

3. (i) a (ii) a (iii) b (iv) d (v) c (vi) b (vii) b

4. (i) -3 ଓ 2 (ii) 4 ଓ $\frac{1}{2}$ (iii) $\frac{3}{7}$ ଓ $-\frac{1}{2}$ (iv) $\frac{1}{3}(16+\sqrt{220})$ ଓ $\frac{1}{3}(16-\sqrt{220})$

(v) $-2p$ ଓ $3q$ (vi) $\frac{-4\sqrt{3}}{3}$ ଓ $-2\sqrt{3}$ (vii) $\frac{-3+\sqrt{2}}{5}$ ଓ $\frac{-3-\sqrt{2}}{5}$ (viii) $\frac{-2b}{a}$ ଓ $\frac{-2b}{3a}$

(ix) $\frac{-a \pm \sqrt{a^2 - 4b}}{2}$ (x) $-a, (a - b)$

5. (i) $2, \frac{3}{4}$ (ii) $\frac{1}{2}, 2$ (iii) $\sqrt{2}, 1$ (iv) $a, \frac{1}{a}$ (v) $-\frac{1}{3}, -\frac{3}{2}$ (vi) $-23, \frac{5}{2}$

(vii) $\frac{2}{3}, \frac{-3}{4}$ (viii) $2, \frac{-5}{6}$ (ix) $-\frac{4}{3}, \frac{7}{5}$ (x) $8, -8$

6. $k=3$, 7. $P=4$, 8. $\frac{15}{4}$, 9. $\frac{11}{2}$, 10. $p=2$, 12. $\frac{229}{36}$; 13. $2p$, 14. $m=\frac{1}{2}, 2$; 16. $x^2-3x-10=0$

ଅନୁଶୀଳନୀ - 2(b)

1. (i) $x^2 - 2x + 1 = 0$ (ii) $y^2 + y - 20 = 0$ (iii) $x^2 - 18x + 72 = 0$ (iv) $0, 1$

(v) $n^2+n-240=0$ (vi) $x^2-13x+28=0$,

(vii) $x^2 - 7x = 0$ କିମ୍ବା $t = \sqrt{x+9}$ ଶୁଦ୍ଧକରି $t^2 - t - 12 = 0$ (viii) $x^2-12x+32=0$

2. (i) 16 (ii) $\frac{5}{4}$ କିମ୍ବା $\frac{4}{5}$ (iii) $5, 6$ (iv) $11, 12$ (v) $9, 42$

3. 24 4. 12 5. 48 କିମ୍ବା 16 6. 5 ଶେ.ମି., 7. 15 ଶେ.ମି., 8 ଶେ.ମି. 8. 12

9. 18 ମି., 12 ମି. 10. 3 କି.ମି. ପ୍ରତି ଘଣ୍ଟା 11. 5 କି.ମି. / ଘଣ୍ଟା 12. 100

13. 56 ମି. 14. 25 କି.ମି. ଘଣ୍ଟା ପ୍ରତି 15. 2.5 ମିଟର 16. 24

17. (i) $-6, 1$ (ii) $27, \frac{25}{147}$, (iii) $\frac{1}{4}, \frac{5}{12}$, (iv) $\frac{-3}{4}, \frac{-3}{2}$, (v) $\pm 2, \pm 3$, (vi) $-1, 1$

(vii) $-1, 3, 1 \pm \sqrt{2}$, (viii) $\pm 1, \pm \frac{1}{2}$, (ix) $2, \frac{1}{2}$, (x) $\frac{1}{8}$, (xi) $\frac{3}{2}, -\frac{5}{2}$ (xii) $3, -\frac{3}{2}$

(xiii) $-4, 9$, (xiv) $1, -1, \frac{-2 \pm \sqrt{13}}{3}$ (xv) $0, 2$, (xvi) 8 , (xvii) 6

ଅନୁଶୀଳନୀ - 3(a)

1.(i) 8 , (ii) 14 , (iii) 13 , (iv) 3 , (v) 2 , (vi) 11 , (vii) 0.4 , (viii) 6 , (ix) 0.5 , (x) -5 ; 2. (ii) (vi) ∇ ଚଢ଼

(viii); 3. (ii) 7 , (iii) d ∇ ଚଢ଼ (viii) 3 ; 4. (i) $10, 15, 20, 25$, (ii) $9, 13, 17, 21$, (iii) $7, 9, 11, 13$, (iv)

$3, 1, -1, -3$, (v) $2, -1, -4, -7$; 5. (i) $3, 4.5, 5.5$ (ii) $0, 6, 10$, (iii) $55, 85, 105$, (iv) $14, 26, 34$;

6. (i) $7, 10, 13$, (ii) $-10, -12, -14$, (iii) $3, -1, -5$, (iv) $15, 20, 25$, (v) $2, \frac{7}{2}, 5$, (vi) $-\frac{1}{2}, \frac{-3}{2}, \frac{-5}{2}$;

7. T: (a), (d), (e), (f), (i); 8.(a) 465 , (b) 100 , (c) 240 , (d) -15 , (e) 21 , (f) 89 , (g) 312 , (h) $-$

777 , (i) -270 , (j) -2800 , (k) $\frac{n}{2}(n+1)$, (l) $-26\frac{2}{3}$; 9. (a) 210 , (b) -493 , (c) $1, 3, 5, 7, 9$ (d)

$5, 8, 11, 5795$, (e) 3575 , (f) $\frac{n}{2}(1-3n)$, (g) 29 , (h) 21 , (i) 5 , (j) 102 ; 10. (i)(a) 5565 , (b) 4071 ,

(c) 18648; (ii) (a) 210, (b) 1275, (iii) 3159, (iv) 2450, (v) 5625; 11. 6 ବା 12; 12.(i) 4,6,8 ବା 8,6,4, (ii) 3,5,7,9,11, 13 ବା 13, 11, 9, 7, 5, 3; 13. 5,7,9 ବା 9,7, 5; 15. 950; 16. 13267; 17. 6,5,4; 18. 3, 5, 7 ବା 7,5,3; 19. 1,3,5,7 ବା 7,5,3,1;

ଅନୁଶୀଳନୀ - 3(b)

1.(a) $\frac{1}{15}$, (b) $\frac{1}{12}$, (c) $\frac{1}{n}$, (d) $\frac{1}{n+1}$, (e) 7, (f) 3 (g) a (h)15; 2. (a) $\frac{20}{11}$, (b) $\frac{16}{105}$;

3.(a) $5n^2+40n+60$, (b) $n(n+1)(n^2+3n+1)$, (c) $\frac{2n^3+9n^2+4n}{6}$, 3080, (d) n^2+2n ,

$\frac{2n^3+9n^2+7n}{6}$, 495; 4.(a) $\frac{1}{6}n(n+1)(4n-1)$, (b) $\frac{1}{3}(4n^2+6n-1)$ (c) $3n(n+1)(n+3)$

(d) $\frac{n(n+1)(2n+1)}{6}$ (e) $\frac{1}{2}n(6n^2-3n-1)$ (f) $\frac{2}{3}n(n+1)(2n+1)$ (g) $\frac{1}{2}n^2(n+1)$ (h) $\frac{1}{12}n(n+1)^2$

(n+2); 5.(i)21 (ii) 19 ଓ 23; 6.(i)20 ଓ 28, (ii) 18, 24 ଓ 30; 7.(i) $\frac{58}{3}$ ଓ $\frac{98}{3}$, (ii) 14, 22, 30 ଓ

38; 8.(i) 20, 35 ଓ 50, (ii) 15, 25, 35,45 ଓ 55; 9. 11; 10. -4, -1, 2, 5 କିମ୍ବା 5, 2, -1, -4

ଅନୁଶୀଳନୀ - 4(a)

1.(i) 0, (ii) 1, (iii) $\frac{1}{2}$, (iv) 0.38, (v) $\frac{3}{4}$, (vi) 1, (vii) 0.95; 2. $\frac{8}{15}, \frac{7}{15}$; 3. $\frac{1}{3}, \frac{2}{3}$; 4. 0; 5. $\frac{3}{5}$;

6. $\frac{3}{4}, \frac{1}{4}$, ସମଷ୍ଟି 1; 7. $\frac{5}{8}, \frac{3}{8}$; 8. (i) $\frac{2}{9}$ (ii) $\frac{1}{3}$ (iii) $\frac{4}{9}$; 9.(i) $\frac{1}{4}$ (ii) $\frac{2}{3}$ (iii) $\frac{7}{12}$; 10. (i) $\frac{4}{5}$ (ii) $\frac{1}{5}$

ଅନୁଶୀଳନୀ - 4(b)

1. ଠିକ୍ ଉଚ୍ଛି; (i) (vi)(viii)(ix); 2. $\frac{1}{4}$; 3. (i) $\frac{1}{2}$, (ii) $\frac{1}{3}$, (iii) $\frac{2}{3}$, (iv) $\frac{5}{6}$, (v) 1, (vi) 0; 4. $\frac{1}{5}$; 5. $\frac{2}{5}$;

6. $\frac{1}{2}$; 7. $\frac{1}{2}$; 8. $\frac{5}{6}$; 9.(i) $\frac{3}{4}$ (ii) $\frac{1}{4}$ (iii) $\frac{3}{4}$, (iv) $\frac{1}{4}$; 10. (i) $\frac{1}{8}$ (ii) $\frac{1}{2}$, (iii) $\frac{7}{8}$, (iv) $\frac{1}{8}$, (iv) $\frac{1}{8}$;

11. (i) $\frac{5}{36}$ (ii) $\frac{1}{12}$, (iii) $\frac{1}{18}$ (iv) $\frac{1}{6}$ (v) $\frac{11}{36}$ (vi) $\frac{1}{12}$; 12. 0.9, 0.6; 13. (i) $\frac{3}{4}$ (ii) $\frac{3}{8}$ (iii) $\frac{3}{4}$ (iv) $\frac{7}{8}$; 14. $\frac{1}{2}$; 15. $\frac{1}{2}$; 16. $\frac{5}{6}$

ଅନୁଶୀଳନୀ - 5(a)

1. T - (i) (ii) (iii) (vi)(viii); 2. (i) (B) 60, (ii) (B) $10\frac{1}{2}$ (iii) (A) $\frac{n-1}{2}$ (iv) (c) $n+1$ (v) (B) n , (vi) (D) $m+2$ (vii) (C) $4m$ (viii) (D) $(M-x)$ (ix) (B) $\frac{M}{5}$ (x) (B) $\frac{12a+10b}{a+b}$ (xi) (C) 1000 (xii) (C) 12 (xiii) (A) 0 (xiv) (B) $x+4$ (xv) (C) 6.5

3. 42.4, 4. 29.2, 5. 4.17 gm, 6. 30, 8. 49.6; 9. 103.5, 10. 12.24, 11. 151, 10. 43, 12. 49.6, 13(i). 16, 14. $f_1 = 28, f_2 = 24$, 15. 40, 16. $n = 12, m = 10$

ଅନୁଶୀଳନୀ - 5(b)

1. T - (ii) (v); 2. (i) 7 (ii) 61.5 (iii) 9, (iv) 29; 3.(i) 14, (ii) 4, (iii)34.3; 4. 93.3; 5. 26.25;
6. 28; 7. 7; 8. 25; 9. 36, 8; 10. 30.0 ପ୍ରାୟ, 11. 15, 10, 12. (i) 52.2 (ii) 140

ଅନୁଶୀଳନୀ - 5(c)

1.T : (i); 2. (i) 9, (ii) 10,11, 3. 122, 4. 7, 5. (i) 8, (ii) ଗରିଷ୍ଠକ 6. 5;

ଅନୁଶୀଳନୀ - 6(a)

1. (i) 5, (ii) 6, (iii) 10, (iv) $\sqrt{2}$ (v) $\sqrt{10}$, (vi) $2\sqrt{a^2 + b^2}$; 2. (i) (iii) ଏବଂ (iv) ମୂଳ ବିନ୍ଦୁଠାରୁ
ସମଦୂରବର୍ତ୍ତୀ । 8. 4; 9.6 କିମ୍ବା -2 ; 13(2,0); 15. $(2, 3+2\sqrt{3})$

ଅନୁଶୀଳନୀ - 6(b)

1. (i) -2 , (ii) $\left(\frac{1}{2}, \frac{1}{2}\right)$, (iii) $(-2, -3)$, (iv) $\left(\frac{2}{3}, \frac{4}{3}\right)$; 2.(i) $(2, 1)$, (ii) $\left(\frac{3}{2}, \frac{3}{2}\right)$, (iii) $\left(\frac{5}{12}, \frac{5}{12}\right)$,
(iv) $\left(-2, \frac{-3}{2}\right)$, (v) $\left(1, \frac{-3}{2}\right)$, (vi) $\left(\frac{a+c}{2}, \frac{b+d}{2}\right)$, (vii) $\left(-\frac{5}{2}, \frac{-3}{2}\right)$, (viii) $\frac{a(t_1+t_2)}{2}$, $a(t_1+t_2)$; 3. (i) h
 $= -4$, $k = 5$, (ii) $h = -7$, $k = 1$, (iii) $h = -4$, $k = 1$, (iv) $h = -\frac{1}{4}$, $k = \frac{5}{4}$; 4. $(-2, -3)$; 5. $(-4, 0)$;
6. $(1, -3)$; 7. $x = 10$, $y = -7$; 8. $\left(\frac{7}{5}, \frac{18}{5}\right)$; 9. $\left(1, -\frac{9}{7}\right)$; 10. $k = 15$; 12. $h = -10$, $k = 4$; 13.
 $c(4, 0)$; 15 $\left(4, -\frac{5}{2}\right)$ 16. $(3, 4)$, $(5, 3)$; 20. (i) $B(-a, 0)$, $c(0, \sqrt{3}a)$ (ii) $2a$, (iii) $\sqrt{3}a$ (iv) $\left(0, \frac{\sqrt{3}a}{3}\right)$

ଅନୁଶୀଳନୀ - 6(c)

1. (i) 0, (ii) 2, (iii) 0, (iv) 3 (v)1; 2. (i) $\frac{5}{2}$ (ii) $\frac{1}{2}$ (iii) 18, (iv) 10.5, (v)14; 4.3; 5.8; 6.4;
7. 5; 8. $2x - y = 1$; 9. 11.5 ବର୍ଗ ଏକକ; 10. 32.5 ବର୍ଗ ଏକକ; 11. $B(-3, -5)$, $C(5, 3)$, 8 ବର୍ଗ ଏକକ;
12. 0.6; 13. 0 କିମ୍ବା 1; 14. 2; 17. -7 କିମ୍ବା 1 ।

