

ANSWERS

1. ANGLE AND ITS MEASUREMENT

Exercise : 1.1

- 1) (A) (i), (iii), (iv), (vi) are co-terminal.
(ii), (v) are non co-terminal.
(B) (i) III (ii) III (iii) I (iv) I (v) III
(vi) I (vii) IV (viii) I (ix) III (x) III
- 2) (i) $\frac{17\pi}{36}$ (ii) $\frac{25\pi}{18}$ (iii) $\frac{-11\pi}{15}$ (iv) $\frac{131\pi}{360}$
(v) $\frac{151\pi}{360}$ (vi) $\frac{51\pi}{225}$
- 3) (i) 105° (ii) -300° (iii) $\left(\frac{900}{\pi}\right)^0$
(iv) 110° (v) $\left(\frac{-45}{\pi}\right)^0$ or $14^\circ 19'$ approx"
- 4) (i) $183^\circ 42'$ (ii) $245^\circ 19' 48''$ (iii) $11^\circ 27' 33''$
- 5) 25° , $\frac{5\pi}{36}$
- 6) 30° , $\frac{\pi}{6}$
- 7) 40° , 50° and 90° that is $\frac{2\pi}{9}$, $\frac{5\pi}{18}$ and $\frac{\pi}{2}$
- 8) 420° and 480°
- 9) 30° , 70° and 80° that is $\frac{\pi}{6}$, $\frac{7\pi}{18}$ and $\frac{4\pi}{9}$
- 10) 20° , 60° and 100° that is $\frac{\pi}{9}$, $\frac{\pi}{3}$ and $\frac{5\pi}{9}$
- 11) 40° , 60° , 140° and 120°
- 12) 64° , 96° , and 128° that is $\frac{16\pi}{45}$, $\frac{8\pi}{15}$ and $\frac{32\pi}{45}$

- 13) (i) 72° or $\frac{2\pi}{5}$ and 108° or $\frac{3\pi}{5}$
(ii) 60° or $\frac{\pi}{3}$ and 120° or $\frac{2\pi}{3}$
(iii) $(51.43)^\circ$ or $\frac{2\pi}{7}$
and $(128.57)^\circ$ or $\frac{5\pi}{7}$
(iv) 45° or $\frac{\pi}{4}$ and 135° or $\frac{3\pi}{4}$
- 14) (i) 85° (ii) 100° (iii) $162^\circ 30'$
(iv) $97^\circ 30'$ (v) 50° (vi) 115°

Exercise : 1.2

- (1) 9π cm (2) 3π cm (3) $\left(\frac{108}{\pi}\right)^0$ or $(34.40)^\circ$
approx (4) 4.4cm
- (5) 4 : 5 (6) 4π cm and 10π sqcm
- (7) $18(\pi - 2\sqrt{2})$ sqcm (8) $\frac{225}{4}\left(\frac{\pi}{3} - 1\right)$ sqcm
- (9) 25 sq cm (10) 160 sq cm

MISCELLANEOUS EXERCISE - 1

- (I) (i) B (ii) B (iii) A (iv) D (v) D (vi) C
(vii) B (viii) B (ix) A (x) C.
- (II) (1) 8 (2) $49\left(\frac{\pi}{2} - 1\right)$ sqcm (3) 3π cm
(4) 35.7 cm (5) $\left(\frac{450}{\pi}\right)^0$ (6) 13:22

- (7) 15π cm and $\frac{135\pi}{2}$ sq cm (9) $17^\circ 11' 20''$ (11) $60^\circ, 80^\circ, 100^\circ, 120^\circ$ that is $\frac{\pi}{3}, \frac{4\pi}{9}, \frac{5\pi}{9}, \frac{2\pi}{3}$
- (10) $\frac{20\pi}{3}$

2. TRIGONOMETRY - I

Exercise : 2.1

(1)

θ	0°	30°	45°	60°	150°	180°	210°	300°	330°
$\sin\theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	0	$\frac{1}{-2}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{-2}$
$\cos\theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
$\tan\theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	$-\frac{1}{\sqrt{3}}$	0	$\frac{1}{\sqrt{3}}$	$-\sqrt{3}$	$-\frac{1}{\sqrt{3}}$
$\operatorname{cosec}\theta$	N.D.	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	2	N.D.	-2	$-\frac{2}{\sqrt{3}}$	-2
$\sec\theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	$-\frac{2}{\sqrt{3}}$	-1	$-\frac{2}{\sqrt{3}}$	2	$\frac{2}{\sqrt{3}}$
$\cot\theta$	N.D.	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	$-\sqrt{3}$	N.D.	$\sqrt{3}$	$-\frac{1}{\sqrt{3}}$	$-\sqrt{3}$

θ	-30°	-45°	-60°	-90°	-120°	-225°	-240°	-270°	-315°
$\sin\theta$	$-\frac{1}{2}$	$-\frac{1}{\sqrt{2}}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1	$\frac{1}{\sqrt{2}}$
$\cos\theta$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{1}{\sqrt{2}}$	$-\frac{1}{2}$	0	$\frac{1}{\sqrt{2}}$
$\tan\theta$	$-\frac{1}{\sqrt{3}}$	-1	$-\sqrt{3}$	N.D.	$\sqrt{3}$	-1	$-\sqrt{3}$	N.D.	1
cosec	-2	$-\sqrt{2}$	$-\frac{2}{\sqrt{3}}$	-1	$-\frac{2}{\sqrt{3}}$	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1	$\sqrt{2}$
$\sec$	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	N.D.	-2	$-\sqrt{2}$	-2	N.D.	$\sqrt{2}$
$\cot$	$-\sqrt{3}$	-1	$-\frac{1}{\sqrt{3}}$	0	$\frac{1}{\sqrt{3}}$	-1	$-\frac{1}{\sqrt{3}}$	0	1

(2) (i) Positive (ii) Positive (iii) Negative

(3) $\cos 4^\circ > \cos 4^c$, $\cos 4^\circ > 0$, $\cos 4^\circ < 0$

(4) (i) III (ii) III

(5) (i) $\frac{1+\sqrt{2}}{2}$ (ii) $1 + \sqrt{2}$ (iii) 0

(6) $\sin \theta = -\frac{4}{5}$, $\cos \theta = \frac{3}{5}$, $\tan \theta = -\frac{4}{3}$,
 $\operatorname{cosec} \theta = -\frac{5}{4}$, $\sec \theta = \frac{5}{3}$, $\cot \theta = -\frac{3}{4}$,

(7) $-\frac{119}{120}$, $\frac{144}{25}$

(8) (i) $\frac{1}{2}$ (ii) 2

(9) (i) $\sin \theta = -\frac{4}{5}$, $\operatorname{cosec} \theta = -\frac{5}{4}$, $\sec \theta = -\frac{5}{3}$

$\tan \theta = \frac{4}{3}$, $\cot \theta = \frac{3}{4}$

(ii) $\cos A = -\frac{7}{25}$, $\sin A = \frac{24}{25}$, $\tan A = -\frac{24}{7}$

$\operatorname{cosec} A = \frac{25}{24}$, $\cot A = -\frac{7}{24}$

(iii) $\sin x = -\frac{4}{5}$, $\cos x = -\frac{3}{5}$, $\operatorname{cosec} x = -\frac{5}{4}$

$\sec x = -\frac{5}{3}$, $\tan x = \frac{4}{3}$

(iv) $\sin x = -\frac{5}{13}$, $\cos x = \frac{12}{13}$,

$\cot x = -\frac{12}{5}$, $\operatorname{cosec} x = -\frac{13}{5}$,

$\sec x = \frac{13}{12}$

Exercise : 2.2

(1) $\frac{2(1+\sqrt{3})}{\sqrt{3}(\sqrt{3}+\sqrt{2})}$ (2) -5 (3) $\frac{8}{11}$

(4) (i) $16x^2 - 9y^2 = 144$ (ii) $16x^2 - 9y^2 = 576$

(iii) $x^2 + y^2 = 41$

(iv) $\left(\frac{x-5}{6}\right)^2 - \left(\frac{y-3}{8}\right)^2 = 1$

(v) $\left(\frac{3y-5}{3}\right)^2 - \left(\frac{2x-3}{4}\right)^2 = 1$

(5) $\cos \theta = \pm 1$ (6) $\frac{1}{2}$ (7) 30° (8) 60°

(9) 1 or $\frac{7}{25}$ (10) $\frac{13}{12}$ (11) -8

(12) (i) (0, 3) (ii) (-1, 0)

(13) (i) $(5\sqrt{2}, 45^\circ)$ (ii) $(2, 60^\circ)$

(iii) $(\sqrt{2}, 225^\circ)$ (iv) $(2, 150^\circ)$

(14) (i) $\frac{\sqrt{3}}{2}$ (ii) $\frac{1}{2}$ (iii) $\frac{1}{\sqrt{3}}$

MISCELLANEOUS EXERCISE - 2

(I)

1	2	3	4	5	6	7	8	9	10
B	A	A	B	A	B	D	C	B	B

(II)

	90°	120°	225°	240°	270°	315°	-120°	-150°	-180°
sin	1	$\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{2}}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{1}{\sqrt{2}}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	0
cos	0	$-\frac{1}{2}$	$-\frac{1}{\sqrt{2}}$	$-\frac{1}{2}$	0	$\frac{1}{\sqrt{2}}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	-1
tan	N.D.	$-\sqrt{3}$	1	$\sqrt{3}$	N.D.	-1	$\sqrt{3}$	$\frac{1}{\sqrt{3}}$	0
cosec	1	$\frac{2}{\sqrt{3}}$	$-\sqrt{2}$	$-\frac{2}{\sqrt{3}}$	-1	$-\sqrt{2}$	$-\frac{2}{\sqrt{3}}$	-2	N.D.
sec	N.D.	-2	$-\sqrt{2}$	-2	N.D.	$\sqrt{2}$	-2	$-\frac{2}{\sqrt{3}}$	-1
cot	0	$-\frac{1}{\sqrt{3}}$	1	$\frac{1}{\sqrt{3}}$	0	1	$\frac{1}{\sqrt{3}}$	$\sqrt{3}$	N.D.

-210°	-300°	-330°
$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
$-\frac{1}{\sqrt{3}}$	$\sqrt{3}$	$\frac{1}{\sqrt{3}}$
2	$\frac{2}{\sqrt{3}}$	2
$-\frac{2}{\sqrt{3}}$	2	$\frac{2}{\sqrt{3}}$
$-\sqrt{3}$	$\frac{1}{\sqrt{3}}$	$\sqrt{3}$

$$(8) \cos \theta = \frac{2xy}{x^2 + y^2}, \quad \tan \theta = \frac{x^2 - y^2}{2xy}$$

$$(9) -1$$

3. TRIGONOMETRY - II

Exercise : 3.1

$$\text{Q.1 (i) } \frac{\sqrt{3}+1}{2\sqrt{2}} \quad \text{(ii) } \frac{\sqrt{3}-1}{2\sqrt{2}} \quad \text{(iii) } \frac{\sqrt{3}+1}{1-\sqrt{3}} \quad \text{(iv) } 1$$

$$\text{Q.3 (i) } \frac{33}{65} \quad \text{(ii) } \frac{-16}{65} \quad \text{(iii) } \frac{-33}{56}$$

Exercise : 3.2

$$\text{Q.1 (i) } -\frac{1}{2} \quad \text{(ii) } \frac{1}{\sqrt{2}} \quad \text{(iii) } \frac{1}{\sqrt{2}}$$

$$\text{(iv) } -\frac{1}{2} \quad \text{(v) } 1 \quad \text{(vi) } \frac{1}{\sqrt{3}}$$

(2) (i) Positive (ii) Negative (iii) Negative

(3) (i) IV (ii) III (iii) II

(4) $\sin 1856 > \sin 2006$

(5) $\sin(-310^\circ)$

(vii) -2 (viii) $-\sqrt{2}$ (ix) $\frac{2}{\sqrt{3}}$

(x) $-\sqrt{3}$

Exercise : 3.3

Q.1 (i) $\sqrt{\frac{\sqrt{2}-1}{2\sqrt{2}}}$ OR $\frac{\sqrt{2-\sqrt{2}}}{2}$

(ii) $\sqrt{\frac{\sqrt{2}+1}{2\sqrt{2}}}$ OR $\frac{\sqrt{2+\sqrt{2}}}{2}$

Q.2 $\frac{-120}{169}, \frac{-119}{169}, \frac{120}{119}$

Exercise : 3.4

Q.1 (i) $\sin 6x + \sin 2x$ (ii) $\sin \frac{7\pi}{6} + \sin \frac{\pi}{6}$
 (iii) $\cos 6\theta + \cos 2\theta$ (iv) $\cos 110^\circ + \cos 40^\circ$

MISCELLANEOUS EXERCISE - 3

Q.1 (1) B (2) C (3) D (4) C (5) C
 (6) B (7) C (8) B (9) A (10) A

4. DETERMINANTS AND MARTICES

Exercise : 4.1

Q.1 (i) -2 (ii) -10 (iii) 46
 (iv) $abc + 2fgh - af^2 - bg^2 - ch^2$

Q.2 (i) $x = 0, x = -1, x = 2$ (ii) $x = -2$

Q.3 $x = 11, y = 52$

Q.4 $M_{11} = 11, C_{11} = 11, M_{12} = 7, C_{12} = -7,$
 $M_{13} = -3, C_{13} = -3$

$M_{21} = -23, C_{21} = 23, M_{22} = -11, C_{22} = -11,$
 $M_{23} = 19, C_{23} = -19$

$M_{31} = -5, C_{31} = -5, M_{32} = -5, C_{32} = 5,$
 $M_{33} = 5, C_{33} = 5$

Q.5 -28

Q.6 -2

Exercise : 4.2

Q.1 (i) 0 (ii) 0 (iii) 0

Q.5 (i) $x = -\frac{7}{3}$ (ii) $x = 1$ or 2 or 3 .

Q.6 $x = 0$ or 12

Exercise : 4.3

Q.1 (i) 1, 2, 3 (ii) $-5, 3, 4$ (iii) 2, 2, -1
 (iv) $-\frac{1}{4}, \frac{1}{2}, 1$.

Q.2 3, 5, 7

Q.3 (1) Consistent (ii) Not Consistent
 (iii) Consistent

Q.4 (i) 16 (ii) 2

Q.5 (i) 16 sq. unit (ii) $\frac{25}{8}$ sq. unit
 (iii) 10 sq. unit

Q.6 21 sq. unit

Q.7 1 or -5

Q.8 (i) Collinear (ii) Non - Collinear
 (iii) Collinear

MISCELLANEOUS EXERCISE - 4 (A)

(I)

1	2	3	4	5	6	7	8	9	10
B	B	B	B	B	C	C	D	D	C

(II) Q.1 (i) -113 (ii) -76

Q.2 -2

Q.3 (i) 0 (ii) 0

Q.4 (i) $M_{11}=14, C_{11}=14, M_{12}=-4, C_{12}=4,$
 $M_{13}=8, C_{13}=8$

$M_{21}=16, C_{21}=-16, M_{22}=-2, C_{22}=-2,$
 $M_{23}=4, C_{23}=-4$

$M_{31}=-4, C_{31}=-4, M_{32}=5, C_{32}=-5,$
 $M_{33}=-1, C_{33}=-1$

(ii) $M_{11}=0, C_{11}=0, M_{12}=11, C_{12}=-11,$
 $M_{13}=0, C_{13}=0$

$M_{21}=-3, C_{21}=3, M_{22}=1, C_{22}=1, M_{23}$
 $=1, C_{23}=-1$

$M_{31}=2, C_{31}=2, M_{32}=-8, C_{32}=8, M_{33}=3,$
 $C_{33}=3$

Q.5 (i) $-\frac{1}{3}$ or 2 (ii) $\frac{2}{3}$

Q.9 (i) 1, 2, 1 (ii) 1, 2, 3 (iii) 1, 2, -1

(iv) $\frac{9}{2}, -\frac{3}{2}, \frac{1}{2}$

Q.10 (i) $\frac{1}{3}$ (ii) 5 (iii) 5

Q.11 (i) 4 (ii) $\frac{25}{2}$ (iii) $\frac{13}{2}$

Q.12 (i) 0 or 8 (ii) 1 or 34

Q.13 32 sq. unit

Q.14 ₹1750, ₹1500, ₹1750

Exercise : 4.4

$$Q.1 \begin{pmatrix} 0 & \frac{1}{4} \\ \frac{1}{3} & 0 \\ 2 & \frac{1}{2} \end{pmatrix} \quad (ii) \begin{pmatrix} -2 & -5 \\ -1 & -4 \\ 0 & -3 \end{pmatrix} \quad (iii) \frac{1}{5} \begin{pmatrix} 8 & 27 \\ 27 & 64 \\ 64 & 125 \end{pmatrix}$$

Q.2 (i) Upper triangular matrix

(ii) Skew - symmetric matrix

(iii) Column matrix

(iv) row matrix

(v) scalar matrix

(vi) Lower triangular matrix

(vii) diagonal matrix

(viii) symmetric matrix

(ix) Identity matrix

(x) symmetric matrix

Q.3 (i) Singular (ii) Singular

(iii) Non-Singular (iv) Non-Singular

Q.4 (i) $-\frac{6}{7}$ (ii) 6 (iii) $\frac{49}{8}$

$$Q.5 \begin{pmatrix} 5 & 1 & -1 \\ 3 & 2 & 0 \end{pmatrix}$$

$$Q.6 \begin{pmatrix} 7 & 3 & 1 \\ -2 & -4 & 1 \\ 5 & 9 & 1 \end{pmatrix}$$

Q.7 $a = -4, b = \frac{3}{5}, c = -7$

Q.8 $x = -\frac{3}{2}, y = 5i, z = \sqrt{2}$

Q.9 (i) Symmetric

(ii) Neither Symmetric nor Skew Symmetric

(iii) Skew Symmetric

$$\text{Q.10 } A = \begin{bmatrix} 0 & -1 & -2 \\ 1 & 0 & -1 \\ 2 & 1 & 0 \end{bmatrix} \text{ Skew Symmetric matrix}$$

Exercise : 4.5

$$\text{Q.2 } \begin{bmatrix} 5 & 4 \\ -3 & 23 \end{bmatrix}$$

$$\text{Q.3 } C = \begin{bmatrix} -10 & -1 & 1 \\ 7 & -9 & 3 \\ -4 & 6 & 2 \end{bmatrix}$$

$$\text{Q.4 } X = \begin{bmatrix} -1 & \frac{2}{5} \\ \frac{6}{5} & \frac{19}{5} \\ \frac{19}{5} & \frac{26}{5} \end{bmatrix}$$

$$\text{Q.5 } X = \begin{bmatrix} \frac{3}{8} & -\frac{1}{4} \\ -\frac{3}{8} & \frac{1}{2} \end{bmatrix}, Y = \begin{bmatrix} \frac{1}{8} & \frac{1}{4} \\ -\frac{1}{8} & \frac{1}{2} \end{bmatrix}$$

$$\text{Q.6 } A = \begin{bmatrix} 3 & -\frac{14}{3} & -\frac{8}{3} \\ -2 & 1 & 3 \end{bmatrix}, B = \begin{bmatrix} 0 & -\frac{10}{3} & -\frac{16}{3} \\ 0 & 0 & 5 \end{bmatrix}$$

$$\text{Q.7 } \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Q.8 $A - B$ is singular

$$\text{Q.9 } x = -\frac{1}{4}, y = \frac{9}{2}$$

$$\text{Q.10 } a = 1, b = 0, c = \frac{2}{5}, d = \frac{9}{5}$$

Q.11(i) 1760, 2090,

(ii) Profit of suresh book shop on P, C, M is ₹ 665, ₹ 705.50, ₹ 890.50 respectively. That of Ganesh ₹ 700, ₹ 750, ₹ 1020 respectively.

Exercise : 4.6

$$\text{Q.1 (i) } \begin{bmatrix} 6 & -12 & 9 \\ 4 & -8 & 6 \\ 2 & -4 & 3 \end{bmatrix} \quad (\text{ii) } [8]$$

Q.3 $AB \neq BA$

$$\text{Q.8 } \begin{bmatrix} -5 & -15 \\ 33 & 35 \end{bmatrix}$$

$$\text{Q.10 } \begin{bmatrix} 10 & 10 & 4 \\ 25 & 39 & 2 \\ 35 & 7 & 22 \end{bmatrix}$$

$$\text{Q.11 } \alpha = 1$$

$$\text{Q.13 } k = -7$$

$$\text{Q.17 } a = 2, b = -1$$

$$\text{Q.18 } X = \begin{bmatrix} \frac{5}{3} \\ 3 \\ 7 \\ 3 \end{bmatrix}$$

$$\text{Q.19 } K = 1$$

$$\text{Q.20 } x = -5/3$$

$$\text{Q.21 } x = 19, y = 12$$

$$\text{Q.22 } x = -3, y = 1, z = -1$$

$$\text{Q.24 } \text{Jay ₹104 and Ram ₹150.}$$

Exercise : 4.7

$$\text{Q.1 (i)} \begin{bmatrix} 1 & -4 \\ 3 & 5 \end{bmatrix} \quad \text{(ii)} \begin{bmatrix} 2 & -4 \\ 6 & 0 \\ 1 & 5 \end{bmatrix}$$

$$\text{Q.2} \quad A = \begin{bmatrix} 0 & -2 & -4 \\ 2 & 0 & -2 \\ 4 & 2 & 0 \end{bmatrix} \quad A^T = \begin{bmatrix} 0 & 2 & 4 \\ -2 & 0 & 2 \\ -4 & -2 & 0 \end{bmatrix}$$

both are skew symmetric.

$$\text{Q.7} \quad C^T = \begin{bmatrix} -16 & 14 \\ -6 & -10 \end{bmatrix}$$

$$\text{Q.8 (i)} \begin{bmatrix} 7 & 8 \\ -5 & 8 \\ 12 & -18 \end{bmatrix} \quad \text{(ii)} \begin{bmatrix} 35 & -10 \\ 25 & 15 \\ -15 & 10 \end{bmatrix}$$

$$\text{Q.12 (i)} \begin{bmatrix} 4 & \frac{1}{2} \\ \frac{1}{2} & -5 \end{bmatrix} + \begin{bmatrix} 0 & \frac{-5}{2} \\ \frac{5}{2} & 0 \end{bmatrix}$$

$$\text{(ii)} \frac{1}{2} \begin{bmatrix} 6 & 1 & -5 \\ 1 & -4 & -4 \\ -5 & -4 & 4 \end{bmatrix} + \frac{1}{2} \begin{bmatrix} 0 & 5 & 3 \\ -5 & 0 & 6 \\ -3 & -6 & 0 \end{bmatrix}$$

MISCELLANEOUS EXERCISE - 4 (B)

(I)

1	2	3	4	5	6	7	8	9	10
B	C	A	D	A	C	B	A	A	C

(II) Q.1 (i) diag $[-1 \ 1 \ 3]$ (ii) diag $[23 \ -32 \ -18]$

$$\text{Q.2 (i)} \begin{bmatrix} \cos \alpha & \sin \alpha & 0 \\ -\sin \alpha & \cos \alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\text{(ii)} \begin{bmatrix} 2 \cos \alpha & 0 & 0 \\ 0 & 2 \cos \alpha & 0 \\ 0 & 0 & 2 \end{bmatrix}$$

$$\text{Q.3 (i)} \quad A = \frac{1}{7} \begin{bmatrix} 4 & -4 \\ 0 & 4 \end{bmatrix} \quad B = \begin{bmatrix} \frac{1}{7} & -\frac{1}{7} \\ 0 & \frac{1}{7} \end{bmatrix}$$

$$\text{(ii)} \quad A = \frac{1}{16} \begin{bmatrix} -5 & 10 & 6 \\ 4 & 0 & 25 \end{bmatrix} \quad B = \frac{1}{16} \begin{bmatrix} 1 & -2 & 2 \\ -4 & 0 & -5 \end{bmatrix}$$

$$\text{Q.5} \quad \alpha = 60^\circ \text{ or } \frac{\pi}{3}$$

$$\text{Q.16} \quad x = 2, y = 2$$

$$\text{Q.18} \quad \begin{bmatrix} 2 & -1 \\ 3 & -2 \end{bmatrix}$$

$$\text{Q.19 (i)} \quad x = 7, y = -44 \quad \text{(ii)} \quad x = 5, y = -1$$

$$\text{Q.20 (i)} \quad x = -9, y = -3, z = 0.$$

$$\text{(ii)} \quad x = 31, y = 53, z = 19.$$

$$\text{Q.21} \quad AB^T = \begin{bmatrix} 8 & -7 \\ -12 & 22 \end{bmatrix} \quad A^TB = \begin{bmatrix} 2 & 0 & -4 \\ 7 & -2 & 6 \\ 15 & -6 & 30 \end{bmatrix}$$

Q.25 (i)	Shantaram	Kantaram
Rice	₹ 33000	₹ 39000
Wheat	₹ 28000	₹ 31500
Groundnut	₹ 24000	₹ 24000

(ii)	Shantaram	Kantaram
Rice	₹ 3000	₹ 3000
Wheat	₹ 2000	₹ 1500
Groundnut	₹ 0	₹ 8000

5. STRAIGHT LINE

Exercise : 5.1

1. $2x - 4y + 5 = 0$
2. $9x - y + 6 = 0$
3. $3x^2 + 3y^2 + 4x - 24y + 32 = 0$
4. $x^2 + y^2 - 11x - 11y + 53 = 0$
5. $3x + 4y - 41 = 0$
6. $x^2 + y^2 - 4x - 11y + 33 = 0$
7. (a) $(-1, 0)$ (b) $(0, 2)$
8. (a) $(6, 7)$ (b) $(4, 6)$
9. $(-3, 11)$
10. (a) $3X - Y + 6 = 0$
 (b) $X^2 + Y^2 + X + 4Y - 5 = 0$
 (c) $XY = 0$
 (d) $Y^2 - 4X = 0$

Exercise : 5.2

1. a) 2 b) $\frac{4}{7}$ c) not defined. d) 0.
2. $-\frac{3}{2}$ 3. $\frac{1}{\sqrt{3}}$ 4. 1 5. 135°
7. -1 8. $k = 1$ 9. 45°

Exercise : 5.3

1. a) $y = 5$ b) $x = -5$ c) $y = -1$ or $y = 7$
2. a) $y = 3$ b) $x = 4$
3. a) $x = 2$ b) $y = -3$
4. a) $4x - y - 8 = 0$ b) $x = 2$
5. a) $y = \sqrt{3}x$ b) $y = -3x$
 c) $x - 2y - 7 = 0$ d) $2x - 3y + 9 = 0$
 e) $\sqrt{3}x + y - 4\sqrt{3} - 3 = 0$
 f) $3x - y = 0$

6. $m = 1, c = -1$
7. $x + y - 7 = 0$
8. a) $2x + y - 4 = 0$ b) $2x - 5y + 14 = 0$
 c) $2x + 4y - 13 = 0$
9. a) 3,2 b) $\frac{2}{3}, \frac{3}{2}$ c) -6,4
10. $x - y + 2 = 0, 3x - y = 0$
11. $x + y = 7, 4x - 3y = 0$
12. A : $5x + y - 15 = 0$, B : $3x + 4y - 14 = 0$,
 C : $2x - 3y - 1 = 0$
13. $9x + y + 7 = 0, 8x + 22y - 31 = 0, 2x - 4y + 9 = 0$
14. $\left(\frac{5}{7}, \frac{4}{7}\right)$
15. $3x - 4y = 25$

Exercise : 5.4

1. a) Slope $-\frac{2}{3}$, X-intercept 3, Y-Intercept 2
 b) Slope 3, X-intercept 3, Y-Intercept -9
 c) Slope $-\frac{1}{2}$, intercepts 0
2. a) $2x - y - 4 = 0$ b) $0x + 1y - 4 = 0$
 c) $2x + y - 4 = 0$ d) $2x - 3y + 0 = 0$
4. $(1, -3)$ 5. ± 24 6. $(1, 2)$
7. $(1, -1)$ 8. $\left(\frac{5}{3}, \frac{2}{3}\right)$ 9. $(5, 5)$
10. $x + 3y = 3$ 11. 2 12. 4
13. $\frac{2}{5}$ 14. $\frac{25}{\sqrt{117}}$ 15. $(3, 1)$ and $(-7, 11)$
16. $y + 2 = 0$ 17. $8x + 13y - 24 = 0$
18. $x - 3y + 5 = 0$
19. $2x + y + 13 = 0, x - 9y + 73 = 0,$
 $11x - 4y - 52 = 0, \left(\frac{-1}{19}, \frac{-10}{19}\right)$
20. $(2, 2)$

MISCELLANEOUS EXERCISE - 5

(I)

1	2	3	4	5	6	7	8	9	10
B	C	B	D	B	B	D	B	A	D

- a) 22 b) $\frac{5}{3}$ c) 1
- $y = -2x - \frac{8}{3}$, slope = -2
- 2
- No, point does not satisfy the equation.
- (d)
- a) $y + 3 = 0$ b) $x = -2$
c) $y = 5$ d) $x = 3$
- a) $y = 3$ b) $y = 4$
- a) $5x - y + 7 = 0$ b) $x = 7$ c) $3x - 2y = 0$
- $x = 2$
- 6
- $\frac{12}{5}$
- $x + y = 8$ or $5x - 3y = 0$
- a) BC : $3x + y = 9$, CA : $x = 1$. AB : $x + y = 5$
b) Median AD : $x - y + 3 = 0$,
Median BE : $2x + y = 7$,
Median CF : $5x + y - 11 = 0$
c) $x - 3y + 12 = 0$, $y = 5$, $x - y + 2 = 0$
d) $x - 3y + 11 = 0$, $y = 3$, $x - y + 5 = 0$
- $3y - 7 = 0$
- $17x + 27y - 17 = 0$
- $x + 3y = 7$
- $-\frac{4}{3}$
- 5
- $\frac{22}{9}$

- $3x + y = 9$ and $x - 3y + 7 = 0$
- 20
- $x - 2y + 14 = 0$, $x + 2y = 32$
- $y = 3$, (1, 3)
- $3x - 4y + 8 = 0$
- $3x + 9y = 13$
- $\left(\frac{68}{25}, \frac{-49}{25}\right)$
- (-2, 0) and (8, 0)
- $2x - 9y + 85 = 0$
- $3\sqrt{2}$

6. CIRCLE

Exercise : 6.1

- (i) $x^2 + y^2 = 16$
(ii) $x^2 + y^2 + 6x + 4y - 23 = 0$
(iii) $x^2 + y^2 - 4x + 6y - 12 = 0$
(iv) $x^2 + y^2 + 6x + 6y + 9 = 0$
- (i) (0, 0); 5 (ii) (5, 3); $2\sqrt{5}$
(iii) $\left(\frac{1}{2}, -\frac{1}{3}\right); \frac{1}{6}$
- (i) $x^2 + y^2 - 2ax - 2by + b^2 = 0$
(ii) $x^2 + y^2 + 4x - 6y + 4 = 0$
(iii) $x^2 + y^2 \pm 8x = 0$
(iv) $x^2 + y^2 - 6x - 2y + 6 = 0$
- $x^2 + y^2 - 16x + 20y + 83 = 0$
- $x^2 + y^2 - 2x - 4y = 0$
- $x^2 + y^2 + 8x + 8y + 16 = 0$
- $x^2 + y^2 - 4x + 5y = 0$
- $x^2 + y^2 + 6x - 6y - 47 = 0$

Exercise : 6.2

(1) (i) $(1, -2)$; 3 (ii) $(3, 4)$; 7 (iii) $(3, 1)$, 4

(3) $x^2 + y^2 - 4x - 6y - 12 = 0$

Exercise : 6.3

(1) (i) $x = 3 \cos \theta$, $y = 3 \sin \theta$

(ii) $x = -1 + 3 \cos \theta$, $y = 2 + 3 \sin \theta$

(iii) $x = 3 + 5 \cos \theta$, $y = -4 + 5 \sin \theta$,

(2) $x = \frac{2}{3} + \frac{5}{3} \cos \theta$, $y = -1 + \frac{5}{3} \sin \theta$

(3) $3x - 2y = 0$

(5) $4x - y - 18 = 0$

MISCELLANEOUS EXERCISE - 6

(I)

1	2	3	4	5	6	7	8	9	10
C	C	A	C	A	C	D	C	B	A

(II) (1) $\left(\frac{1}{2}, -1\right), \frac{\sqrt{17}}{2}$ (2) $(3, 2)$, 4

(3) $x^2 + y^2 + 4x - 2y = 0$

(4) $x^2 + y^2 - 4x - 6y = 0$

(6) $5x^2 + 5y^2 + 34x + 8y - 3 = 0$

(8) $x - \sqrt{3} y + 16 = 0$

(9) $x^2 + y^2 = 50$

(10) $x^2 + y^2 - 4x + 6y - 3 = 0$

(11) (i) x-intercept = 12, r - intercept = 9

(ii) x-intercept = 9, r - intercept = 15

(12) (i) $\left(\frac{1}{5}, \frac{-13}{5}\right)$, $3x - 4y - 11 = 0$

(ii) $(1, 2)$, $x + 3y - 7 = 0$

(13) (i) $(2, -4)$, $y + 4 = 0$

(ii) $\left(\frac{8}{5}, \frac{6}{5}\right)$, $3x - 4y = 0$

(14) 7

(15) $k = 8$

(16) $3x + 2y - 26 = 0$

(17) $x - 2y = 5$

(18) $x + \sqrt{3} y = 10$

(19) $(-3, 0)$

(20) -61 (21) $2x + y \pm 4\sqrt{5} = 0$

(22) $3x + 2y \pm 2\sqrt{13} = 0$

(23) $x - 5y \pm 6\sqrt{26} = 0$

(24) $3x - y - 27 = 0$ and $3x - y + 13 = 0$

(25) $x^2 + y^2 = 18$

(26) (i) $xy = 0$ (ii) $5y^2 - 2xy = 5a^2$

(iii) $x^2 - a^2 = c(x^2 - a^2)$

7. CONIC SECTIONs

Exercise : 7.1

1) i. $\left(\frac{6}{5}, 0\right)$, $5x + 6 = 0$, $\frac{24}{5}$, $\left(\frac{6}{5}, \pm \frac{12}{5}\right)$

ii. $(-5, 0)$, $x - 5 = 0$, 20, $(-5, \pm 10)$

iii. $\left(0, \frac{2}{3}\right)$, $3y + 2 = 0$, $\frac{8}{3}$, $\left(\pm \frac{4}{3}, \frac{2}{3}\right)$

iv. $(0, -2)$, $y - 2 = 0$, 8, $(\pm 4, -2)$

v. $\left(-\frac{4}{3}, 0\right)$, $3x - 4 = 0$, $\frac{16}{3}$, $\left(-\frac{4}{3}, \pm \frac{8}{3}\right)$

2) $x^2 = -20y$

3) $3y^2 = 16x$

4) $y^2 = -28x$

5) i) $y^2 = 36x$ ii) $y^2 = \frac{9}{2}x$

6) i) $-\frac{3}{2}$ ii) $-\frac{9}{2}$

7) 4 or 8

8) i) $\left(\frac{1}{3}, 2\right), \frac{10}{3}$ ii) $\left(\frac{7}{2}, -\frac{7}{2}\right), \frac{35}{8}$

9) (16, 8), (16, -8)

10) 18 units

11) 18 sq. units

12) (5, 0)

13) $(1, 2), \left(1, \frac{9}{4}\right),$

$4y - 7 = 0,$

$x = 1$

14) i) $x - y + 3 = 0, 3x - 2y + 4 = 0$

ii) $3x - y + 3 = 0, 3x - 2y + 12 = 0$

15) $k = 24$

17) $x + 2y + 4 = 0$

18) $y = -3x$

19) $\frac{29}{4} = 7.25\text{cm}$

Exercise : 7.2

(1) (a) 10, 6, $(\pm 4, 0), x = \pm \frac{25}{4}; \frac{18}{5}, 8, \frac{25}{2}.$

(b) $4, 2\sqrt{3}, (\pm 10), x = \pm 4, 3, 2, 8.$

(c) $2\sqrt{3}, 2, (\pm \sqrt{2}, 0), x = \pm \frac{3}{\sqrt{2}}, \frac{2}{\sqrt{3}},$
 $2\sqrt{2}, 3\sqrt{2}.$

(d) $\frac{2}{\sqrt{3}}, 1, \left(\pm \frac{1}{2\sqrt{3}}, 0\right) x = \pm \frac{2}{\sqrt{3}}, \frac{\sqrt{3}}{2},$
 $\frac{1}{\sqrt{3}}, \frac{4}{\sqrt{3}}$

(2) (i) $\frac{x^2}{64} + \frac{y^2}{55} = 1$ (ii) $\frac{x^2}{25} + \frac{y^2}{9} = 1$

(iii) $\frac{x^2}{9} + \frac{y^2}{8} = 1$ (iv) $\frac{x^2}{72} + \frac{y^2}{64} = 1$

(v) $\frac{x^2}{25} + \frac{y^2}{16} = 1$ (vi) $\frac{x^2}{16} + \frac{y^2}{12} = 1$

(vii) $3x^2 + 5y^2 = 32$ (viii) $\frac{x^2}{15} + \frac{y^2}{6} = 1$

(ix) $\frac{x^2}{9} + \frac{y^2}{5} = 1$

(3) $e = \frac{2\sqrt{2}}{3}$

(4) $e = \frac{1}{\sqrt{3}}$

(6) 4 sq. unit (7) $\left(\frac{16}{5}, \frac{-9}{5}\right)$ (8) (1, 2)

(9) The line is a tangent and point of contact

$\left(1, \frac{4\sqrt{2}}{3}\right).$

(10) $k = \pm 12\sqrt{2}$

(11) (i) $y + 2 = 0, 8x - y - 18 = 0$

(ii) $y + 2 = 0, 6x + y = 16$

(iii) $5x - y = 9, x + y = 3$

(iv) $4x + 6y = \pm 15$

(v) $x + y = \pm \sqrt{29}$

(vi) $2x - y = \pm 9$

(vii) $3x - 4y = \pm 2\sqrt{65}$

(12) $x^2 + y^2 = 8$

(13) $x^2 - xy - 5 = 0$

(15) $bx - ay = 0$

(17) $x + y = \pm 5$

(18) 4 sq. units

Exercise : 7.4

(1) (i) 10, 8, $\frac{\sqrt{41}}{5}, (\pm \sqrt{41}, 0), x = \pm \frac{25}{41}, \frac{32}{5}$

(ii) 8, 10, $\frac{\sqrt{41}}{4}, (0, \pm \sqrt{41}) y = \pm \frac{16}{\sqrt{41}}, \frac{25}{2}$

$$(iii) 6, 8, \frac{5}{3}, (\pm 5, 0), x = \pm \frac{9}{5}, \frac{32}{3}$$

$$(iv) 4, 2\sqrt{21}, \frac{5}{2}, (\pm 5, 0), x = \pm \frac{4}{5}, 21.$$

$$(v) \frac{4}{\sqrt{3}}, 4, 2, \left(\pm \frac{4}{\sqrt{3}}, 0\right), x = \pm \frac{1}{\sqrt{3}}, 4\sqrt{3}$$

$$(vi) 8, 8, \sqrt{2}, (\pm 4\sqrt{2}, 0), x = \pm 2\sqrt{2}, 8$$

$$(vii) 10, 6, \frac{\sqrt{34}}{5}, (0, \pm \sqrt{34}), y = \pm \frac{25}{\sqrt{34}}, \frac{18}{5}$$

$$(viii) 10, 24, \frac{13}{5}, (0, \pm 13), y = \pm \frac{25}{13}, \frac{288}{5}.$$

$$(ix) 20, 10, \frac{\sqrt{5}}{2}, (\pm \sqrt{5}, 0), x = \pm \frac{20}{\sqrt{5}}, 5$$

$$(x) 4, 4\sqrt{3}, 2, (\pm 4, 0), x = \pm 1, 12.$$

$$(2) \frac{x^2}{24} - \frac{y^2}{25} = 1 \quad (3) e = 2$$

$$(5) (i) \frac{x^2}{4} - \frac{y^2}{21} = 1 \quad (ii) \frac{x^2}{16} - \frac{y^2}{9} = 1$$

$$(iii) \frac{x^2}{4} - \frac{y^2}{5} = 1 \quad (iv) \frac{10x^2}{9} - \frac{y^2}{36} = 1$$

$$(v) \frac{x^2}{9} - \frac{y^2}{27} = 1 \quad (vi) \frac{x^2}{49} - \frac{y^2}{9} = 1$$

$$(vii) \frac{9x^2}{16} - \frac{9y^2}{20} = 1 \quad (ix) \frac{x^2}{16} - \frac{y^2}{9} = 1$$

$$(6) (i) 3x - \sqrt{2}y = 2$$

$$(ii) x - y = 1$$

$$(iii) 5x - 6\sqrt{3}y = 30$$

$$(iv) 3\sqrt{2}x - 4y = 12$$

$$(v) 5x - 4y = 16$$

$$(7) (-6, -2) \quad (8) \pm 5 \quad (9) x + y = \pm 4$$

$$(10) 3x + 2y = \pm 4$$

MISCELLANEOUS EXERCISE - 7

(I)

1	2	3	4	5	6	7	8	9	10
A	C	A	C	A	B	C	C	B	B

11	12	13	14	15	16	17	18	19	20
C	C	B	B	B	C	B	A	C	A

$$(II) 1) i) \left(\frac{17}{8}, 0\right), 8x + 17 = 0, \frac{17}{2}, \left(\frac{17}{8}, \frac{17}{4}\right)$$

$$i) \left(0, \frac{6}{5}\right) 5y + 6 = 0, \frac{24}{5}, \left(\pm \frac{12}{5}, \frac{6}{5}\right)$$

$$2) i) (12, 12) \quad ii) (27, -18) \quad 3) (8, 8) \text{ and } (8, -8)$$

$$4) 3x + 4y + 12 = 0$$

$$5) x - y + 2 = 0$$

$$6) 9x - 4y + 4 = 0, x - 4y + 36 = 0$$

$$8) x + y + 2 = 0, (2, -4)$$

$$13) a) i) 10, 6 \quad ii) (\pm 4, 0) \quad iii) x = \frac{23}{4} \quad iv) \frac{18}{5} \quad v) 8$$

$$vi) \frac{25}{2}$$

$$b) i) 10, 8 \quad ii) (\pm 3, 0) \quad iii) y = \pm \frac{25}{3} \quad iv) \frac{32}{5}$$

$$v) 6 \quad vi) \frac{50}{3}$$

$$c) i) 24, 10 \quad ii) (\pm 13, 0) \quad iii) x = \pm \frac{144}{13} \quad iv) \frac{25}{6}$$

$$v) 26 \quad vi) \frac{288}{13}$$

$$d) i) 8, 8 \quad ii) (\pm 4\sqrt{2}, 0) \quad iii) x = \pm 2\sqrt{2} \quad iv) 8$$

$$v) 8\sqrt{2} \quad vi) \sqrt{2}$$

$$14) i) \frac{x^2}{64} + \frac{y^2}{55} = 1 \quad ii) \frac{x^2}{25} + \frac{y^2}{9} = 1$$

$$iii) 3x^2 + 5y^2 = 32$$

$$15) e = \pm \frac{1}{\sqrt{3}} \quad 17) y+2=0 \text{ or } 8x-y-18=0$$

$$18) 2x + 3y = 25 \quad 19) (1,2)$$

$$20) x^2 - xy - 5 = 0$$

$$22) \text{ i) } \frac{x^2}{36} - \frac{4y^2}{25} = 1 \quad \text{ii) } \frac{x^2}{16} - \frac{y^2}{20} = 1$$

$$\text{iii) } \frac{x^2}{4} - \frac{4y^2}{9} = 1$$

$$23) \text{ i) } 7x - 2y + 17 = 0 \quad \text{ii) } 10x - 3\sqrt{3}y = 15$$

$$\text{iii) } 8x - 5y = 20\sqrt{3}$$

$$24) (3,2) \quad 25) y = 2x \pm 4$$

$$26) k(x^2 - a^2) = 2xy$$

$$5) \text{ S.D. } = 3.76$$

$$6) (C.V.)_p = 27.27; (C.V.)_q = 33.33;$$

i) Worker P is more consistent.

ii) Worker Q seems to be faster in completing the job.

$$7) (C.V.)_1 = 1.07 \quad (C.V.)_2 = 2.5$$

i) First department has larger bill

ii) Second department has larger variability in wages.

$$8) (C.V.)_A = 18.6; (C.V.)_B = 18.7$$

Series B is more variable

$$9) (C.V.)_A = 80; (C.V.)_B = 74.5$$

Team B is more consistent.

$$10) (C.V.)_M = 10; (C.V.)_S = 12$$

The subject Statistic shows higher variability in marks.

8. MEASURES OF DISPERSION

Exercise : 8.1

$$1) 38 \quad 2) 717 \quad 3) 11 \quad 4) 5 \quad 5) 10$$

Exercise : 8.2

$$1) \sigma^2 = 8; \sigma = 2.82$$

$$2) \sigma^2 = 380; \sigma = 19.49$$

$$3) \sigma^2 = 32.39; \sigma = 5.69$$

$$4) \sigma^2 = 4.026; \sigma = 2.006$$

$$5) \sigma^2 = 3.0275; \sigma = 1.74$$

$$6) x = 58.2; \sigma^2 = 653.76; \sigma = 25.56$$

$$7) \sigma^2 x = 41.25; \sigma x = 6.42$$

$$8) 5 \text{ and } 7$$

Exercise : 8.3

$$1) \sigma_c = 5.15$$

$$2) \sigma_c = 3.14$$

$$3) \text{ C.V. } = 6.32$$

$$4) \text{ C.V. } = 20$$

MISCELLANEOUS EXERCISE - 8

(I)

1	2	3	4	5	6	7	8	9	10
C	A	B	D	A	C	B	B	C	B

(II)

$$1) \text{ Range } = 48$$

$$2) \text{ Range } = 89$$

$$3) \text{ Range } = \text{Rs. } 30$$

$$4) \text{ Range } = 60$$

$$5) \text{ Variance } = 7.44, \sigma = 2.72$$

$$6) \text{ Variance } = 2000, \text{ S. D. } = 44.72$$

$$7) \text{ S. D. } = 1.35$$

$$8) \text{ S. D. } = 13.42$$

$$9) \text{ S. D. } = 16.85$$

$$10) \text{ A. M. } = 72; \text{ S. D. } = 12.2$$

$$11) \text{ Mean } = 19.15; \text{ S. D. } = 4.66$$

$$12) \text{ Mean } = 41; \text{ S. D. } = 7.1$$

$$13) \text{ Number of boys } = 75$$

$$\text{combined S. D. } = 10.07$$

- 14) combined S. D. = 2.65
- 15) C.V. = 26.65
- 16) $(C.V.)_B = 6.67$ $(C.V.)_G = 6.38$
Series of boys is more variable
- 17) $(C.V.)_I = 22.22$ $(C.V.)_{II} = 20.83$
Brand-I is more variable
- 18) C.V. = 29.76
- 19) C.V. = 31.35
- 20) $(C.V.)_x = 9.21$; $(C.V.)_y = 5.91$
The variation is greater in the area of the field.
- 21) $(C.V.)_U = 37.67$; $(C.V.)_V = 55.5$
i) Company U gives higher average life
ii) Company U shows greater consistency in performance.
- 22) $(C.V.)_1 = 15.50$ $(C.V.)_2 = 19.96$
Height shows more variability

9. PROBABILITY

Exercise : 9.1

- 1) $S = \{RR, GR, BR, PR, RG, GG, BG, PG, RB, GB, BB, PB, RP, GP, BP, PP\}$
a) $A = \{RR, GR, RB, RP, GR, BR, PR\}$
b) $B = \{RG, RB, RP, GR, GB, GP, BR, BG, BP, PR, PG, PB\}$
- 2) $S = \{(H, 1), (H, 2), (H, 3), (H, 4), (H, 5), (H, 6), (T, 1), (T, 2), (T, 3), (T, 4), (T, 5), (T, 6)\}$
a) $A = \{(T, 1), (T, 3), (T, 5)\}$
b) $B = \{(H, 2), (H, 3), (H, 5), (T, 2), (T, 3), (T, 5)\}$
c) $C = \{(H, 1), (H, 4)\}$
- 3) i) 56 ii) 120 iii) 720 iv) 1140
- 4) $S = \{(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)\}$
a) $A = \{(1, 2), (2, 1), (1, 3), (2, 2), (3, 1), (1, 5), (2, 4), (3, 3), (4, 2), (5, 1), (2, 6), (3, 5), (4, 4), (5, 3), (6, 2), (3, 6), (4, 5), (5, 4), (6, 3), (6, 6)\}$
b) $B = \{(1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1)\}$
c) $C = \{(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6)\}$
d) $D = \{(2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)\}$
e) A and B are mutually exclusive but not exhaustive.
f) C and D are mutually exclusive and exhaustive.
- 5) a) $S = \{(5, 5), (5, 6), (5, 7), (5, 8), (6, 5), (6, 6), (6, 7), (6, 8), (7, 5), (7, 6), (7, 7), (7, 8), (8, 5), (8, 6), (8, 7), (8, 8)\}$
b) $S = \{(5, 6), (5, 7), (5, 8), (6, 5), (6, 7), (6, 8), (7, 5), (7, 6), (7, 8), (8, 5), (8, 6), (8, 7)\}$
- 6) a) $\frac{1}{9}$ b) $\frac{5}{12}$ c) $\frac{1}{6}$ d) $\frac{1}{9}$
- 7) a) $\frac{8}{221}$ b) $\frac{13}{102}$ c) $\frac{12}{51}$ d) $\frac{25}{102}$ e) $\frac{13}{34}$
- 8) a) $\frac{6}{5525}$ b) $\frac{997}{1700}$ c) $\frac{22}{425}$ d) $\frac{16}{5525}$
- 9) a) $\frac{1}{2}$ b) $\frac{1}{2}$ c) $\frac{7}{10}$
- 10) a) $\frac{4}{25}$ b) $\frac{8}{75}$ c) $\frac{7}{25}$ d) $\frac{1}{15}$
- 11) a) $\frac{2}{7}$ 12) i) $\frac{25}{81}$ ii) $\frac{5}{18}$
- 13) i) $\frac{1}{6}$ ii) $\frac{5}{6}$

- 14) i) $\frac{1}{3}$ ii) $\frac{2}{3}$ iii) $\frac{1}{30}$ iv) $\frac{4}{15}$
 15) $\frac{4!}{4^4} = \frac{3}{32}$ 16) $\frac{1}{105}$ 17) i) $\frac{7}{33}$ ii) $\frac{14}{55}$

Exercise : 9.2

- 1) $\frac{2}{3}$ 2) i) 1 ii) $\frac{8}{13}$
 3) i) 0.85 ii) 0.74 iii) 0.15
 4) a) $\frac{22}{75}$ b) $\frac{47}{75}$
 5) 0.69 6) $\frac{5}{18}$
 7) a) $\frac{1}{4}$ b) $\frac{3}{8}$ c) $\frac{3}{4}$
 8) $\frac{1}{2}$ 9) $m = 6$

- 10) i) $\frac{7}{33}$ ii) $\frac{21}{55}$ 11) $\frac{33}{50}$

Exercise : 9.3

- 1) $\frac{2}{7}$ 2) $\frac{7}{22}$ 3) $\frac{1}{9}$
 4) i) $\frac{1}{17}$ ii) $\frac{1}{16}$
 5) a) $\frac{17}{64}$ b) $\frac{3}{64}$ c) $\frac{61}{64}$ d) $\frac{29}{64}$
 6) i) $\frac{9}{20}$ ii) $\frac{11}{20}$ iii) $\frac{9}{20}$ 7) $\frac{11}{25}$
 8) a) $\frac{14}{19}$ (0.733) b) $\frac{1}{7}$ (0.143) c) $\frac{5}{8}$ (0.625)
 9) Independent
 10) a) $\frac{5}{32}$ b) $\frac{23}{48}$ c) $\frac{35}{96}$ d) $\frac{61}{96}$
 11) a) $\frac{1}{4}$ b) $\frac{1}{2}$
 12) a) $\frac{21}{40}$ b) $\frac{19}{40}$ 13) $\frac{10}{21}$ 14) $\frac{1}{4}$
 15) $\frac{11}{221}$ 16) $\frac{901}{1680}$ 18) $\frac{1}{3}$

Exercise : 9.4

- 1) 0.60 2) i) $\frac{27}{52}$ ii) $\frac{25}{52}$
 3) $\frac{16}{99}$ 4) $\frac{4}{5}$ 5) $\frac{12}{37}$

- 6) T = Test positive, S = Sufferer, P(T) = Total probability = 0.10425

a) $\frac{0.00475}{0.10425}$

b) $P(S'/T') = \frac{p(T/S)P(S)}{1 - P(T)} = \frac{0.8955}{0.8958}$

7) $\frac{95}{127} = 0.748$ 8) $\frac{0.018}{0.166} = 0.108$

9) (a) Total Probability = $\frac{2}{3}$ b) $\frac{1}{2}$

10) $\frac{20}{59}$

Exercise : 9.5

1) i) $\frac{3}{5}$ ii) $\frac{3}{5}$ 2) $\frac{16}{21}$ 3) a) $\frac{73}{105}$ b) $\frac{32}{105}$

4) a) $\frac{61}{96}$ b) $\frac{23}{48}$ 5) 65:23 6) 2:1

7) 81 : 44

MISCELLANEOUS EXERCISE - 9

(I)

1	2	3	4	5	6	7	8	9	10
D	A	A	D	B	C	D	D	C	B

II) 1) a) $\frac{1}{14}$ b) $\frac{15}{56}$ 2) $\frac{505}{1001}$ 3) $\frac{4}{7}$

4) $\frac{1}{2}, 1, \frac{1}{3}$ 5) $\frac{6}{55}$ 6) $n(s) = \frac{12!}{(2!)^4}$

a) $\frac{1}{66}$ b) $\frac{1}{99}$ 7) $\frac{19}{90}$ 8) $\frac{3}{7}$

9) $\frac{32}{49}$ 10) $\frac{16}{21}$ 11) i) $\frac{4}{5}$ ii) $\frac{2}{3}$

12) a) $\frac{2}{5}$ b) $\frac{1}{4}$ c) $\frac{3}{5}$ 13) $\frac{5}{28}$

$$14) \text{ a) } \frac{23}{60} \quad \text{b) } \frac{8}{23} \quad 15) \frac{1}{21}$$

$$17) \frac{1}{11}$$

$$18) P(\text{A win}) = \frac{6}{11}, P(\text{B win}) = \frac{5}{11}$$

$$16) P(\text{A}) = \frac{1}{3}, P(\text{B}) = \frac{1}{2}, P(\text{C}) = \frac{1}{2}$$

$$19) \frac{2}{5}$$

$$20) \frac{90}{92}$$

$$21) \frac{2}{3}$$

$$22) \frac{28}{69}$$

$$23) \frac{1}{2}$$

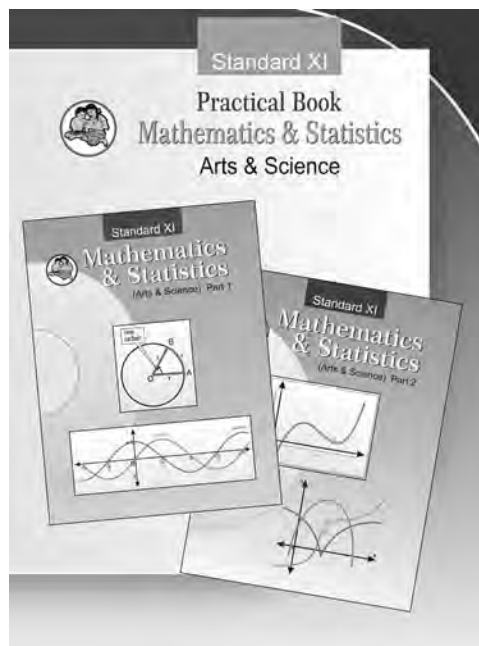


Practical Notebook for Standard XI

Practical Notebook Cum Journal - Mathematics

**English
Medium**

**Price
₹ 52.00**



- Based on Government approved syllabus and textbook
- Inclusion of practicals based on all chapters as per Evaluation scheme.
- With full of various activities, pictures, figures/ diagrams, etc.
- Inclusion of objective/multiple choice questions
- Inclusion of useful questions for oral examination
- More questions for practice and separate space for writing answers

Practical notebooks are available for sale in the regional depots of the Textbook Bureau.

(1) Maharashtra State Textbook Stores and Distribution Centre, Senapati Bapat Marg, Pune 411004 ☎ 25659465
 (2) Maharashtra State Textbook Stores and Distribution Centre, P-41, Industrial Estate, Mumbai - Bengaluru Highway, Opposite Sakal Office, Kolhapur 416122 ☎ 2468576 (3) Maharashtra State Textbook Stores and Distribution Centre, 10, Udyognagar, S. V. Road, Goregaon (West), Mumbai 400062 ☎ 28771842
 (4) Maharashtra State Textbook Stores and Distribution Centre, CIDCO, Plot no. 14, W-Sector 12, Wavanja Road, New Panvel, Dist. Rajgad, Panvel 410206 ☎ 274626465 (5) Maharashtra State Textbook Stores and Distribution Centre, Near Lekhanagar, Plot no. 24, 'MAGH' Sector, CIDCO, New Mumbai-Agra Road, Nashik 422009 ☎ 2391511 (6) Maharashtra State Textbook Stores and Distribution Centre, M.I.D.C. Shed no. 2 and 3, Near Railway Station, Aurangabad 431001 ☎ 2332171 (7) Maharashtra State Textbook Stores and Distribution Centre, Opposite Rabindranath Tagore Science College, Maharaj Baug Road, Nagpur 440001 ☎ 2547716/2523078 (8) Maharashtra State Textbook Stores and Distribution Centre, Plot no. F-91, M.I.D.C., Latur 413531 ☎ 220930 (9) Maharashtra State Textbook Stores and Distribution Centre, Shakuntal Colony, Behind V.M.V. College, Amravati 444604 ☎ 2530965



ebalbharati

E-learning material (Audio-Visual) for Standards One to Twelve is available through Textbook Bureau, Balbharati...

- Register your demand by scanning the Q.R. Code given alongside.
 - Register your demand for E-learning material by using Google play store and downloading ebalbharati app.
- www.ebalbharati.in, www.balbharati.in



$$\begin{bmatrix} 1 & 0 & 4 \\ -2 & 1 & 3 \end{bmatrix} \times \begin{bmatrix} 3 & 1 & 0 \\ -2 & 0 & 5 \\ 4 & 3 & -1 \end{bmatrix} = \begin{bmatrix} 19 & 13 & -4 \\ 4 & 7 & 2 \end{bmatrix}$$



**Maharashtra State Bureau of Textbook Production
and Curriculum Research,
Pune - 411 004.**

₹ 128.00

इंग्रजी गणित आणि संख्याशास्त्र (कला व विज्ञान) भाग-१, इ. ११ वी