

EXERCISE 3.1

1. (i) 3×4 (ii) 12 (iii) $19, 35, -5, 12, \frac{5}{2}$
 2. $1 \times 24, 2 \times 12, 3 \times 8, 4 \times 6, 6 \times 4, 8 \times 3, 12 \times 2, 24 \times 1; 1 \times 13, 13 \times 1$
 3. $1 \times 18, 2 \times 9, 3 \times 6, 6 \times 3, 9 \times 2, 18 \times 1; 1 \times 5, 5 \times 1$

4. (i) $\begin{bmatrix} 2 & \frac{9}{2} \\ \frac{9}{2} & 8 \end{bmatrix}$ (ii) $\begin{bmatrix} 1 & \frac{1}{2} \\ 2 & 1 \end{bmatrix}$ (iii) $\begin{bmatrix} \frac{9}{2} & \frac{25}{2} \\ 8 & 18 \end{bmatrix}$

5. (i) $\begin{bmatrix} 1 & \frac{1}{2} & 0 & \frac{1}{2} \\ \frac{5}{2} & 2 & \frac{3}{2} & 1 \\ 4 & \frac{7}{2} & 3 & \frac{5}{2} \end{bmatrix}$ (ii) $\begin{bmatrix} 1 & 0 & -1 & -2 \\ 3 & 2 & 1 & 0 \\ 5 & 4 & 3 & 2 \end{bmatrix}$

6. (i) $x = 1, y = 4, z = 3$
 (ii) $x = 4, y = 2, z = 0$ or $x = 2, y = 4, z = 0$
 (iii) $x = 2, y = 4, z = 3$

7. $a = 1, b = 2, c = 3, d = 4$

8. C

9. B

10. D

EXERCISE 3.2

1. (i) $A + B = \begin{bmatrix} 3 & 7 \\ 1 & 7 \end{bmatrix}$ (ii) $A - B = \begin{bmatrix} 1 & 1 \\ 5 & -3 \end{bmatrix}$

(iii) $3A - C = \begin{bmatrix} 8 & 7 \\ 6 & 2 \end{bmatrix}$ (iv) $AB = \begin{bmatrix} -6 & 26 \\ -1 & 19 \end{bmatrix}$ (v) $BA = \begin{bmatrix} 11 & 10 \\ 11 & 2 \end{bmatrix}$

2. (i) $\begin{bmatrix} 2a & 2b \\ 0 & 2a \end{bmatrix}$ (ii) $\begin{bmatrix} (a+b)^2 & (b+c)^2 \\ (a-c)^2 & (a-b)^2 \end{bmatrix}$

(iii) $\begin{bmatrix} 11 & 11 & 0 \\ 16 & 5 & 21 \\ 5 & 10 & 9 \end{bmatrix}$ (iv) $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

$$3. \text{ (i) } \begin{bmatrix} a^2+b^2 & 0 \\ 0 & a^2+b^2 \end{bmatrix} \text{ (ii) } \begin{bmatrix} 2 & 3 & 4 \\ 4 & 6 & 8 \\ 6 & 9 & 12 \end{bmatrix} \text{ (iii) } \begin{bmatrix} -3 & -4 & 1 \\ 8 & 13 & 9 \end{bmatrix}$$

$$\text{(iv) } \begin{bmatrix} 14 & 0 & 42 \\ 18 & -1 & 56 \\ 22 & -2 & 70 \end{bmatrix} \text{ (v) } \begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 5 \\ -2 & 2 & 0 \end{bmatrix} \text{ (vi) } \begin{bmatrix} 14 & -6 \\ 4 & 5 \end{bmatrix}$$

$$4. A+B = \begin{bmatrix} 4 & 1 & -1 \\ 9 & 2 & 7 \\ 3 & -1 & 4 \end{bmatrix}, B-C = \begin{bmatrix} -1 & -2 & 0 \\ 4 & -1 & 3 \\ 1 & 2 & 0 \end{bmatrix}$$

$$5. \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$6. \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$7. \text{ (i) } X = \begin{bmatrix} 5 & 0 \\ 1 & 4 \end{bmatrix}, Y = \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix} \text{ (ii) } X = \begin{bmatrix} \frac{2}{5} & \frac{-12}{5} \\ \frac{-11}{5} & 3 \end{bmatrix}, Y = \begin{bmatrix} \frac{2}{5} & \frac{13}{5} \\ \frac{14}{5} & -2 \end{bmatrix}$$

$$8. X = \begin{bmatrix} -1 & -1 \\ -2 & -1 \end{bmatrix}$$

$$9. x = 3, y = 3$$

$$10. x = 3, y = 6, z = 9, t = 6$$

$$11. x = 3, y = -4$$

$$12. x = 2, y = 4, w = 3, z = 1$$

$$15. \begin{bmatrix} 1 & -1 & -3 \\ -1 & -1 & -10 \\ -5 & 4 & 4 \end{bmatrix}$$

$$17. k = 1$$

$$19. \text{ (a) } ₹15000, ₹15000$$

$$\text{ (b) } ₹5000, ₹25000$$

$$20. ₹20160$$

$$21. A$$

$$22. B$$

EXERCISE 3.3

$$1. \text{ (i) } \begin{bmatrix} 5 & \frac{1}{2} & -1 \end{bmatrix}$$

$$\text{ (ii) } \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$$

$$\text{ (iii) } \begin{bmatrix} -1 & \sqrt{3} & 2 \\ 5 & 5 & 3 \\ 6 & 6 & -1 \end{bmatrix}$$

$$4. \begin{bmatrix} -4 & 5 \\ 1 & 6 \end{bmatrix} \quad 9. \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}, \begin{bmatrix} 0 & a & b \\ -a & 0 & c \\ -b & -c & 0 \end{bmatrix}$$

$$10. (i) A = \begin{bmatrix} 3 & 3 \\ 3 & -1 \end{bmatrix} + \begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix}$$

$$(ii) A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix} + \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$(iii) A = \begin{bmatrix} 3 & \frac{1}{2} & \frac{-5}{2} \\ \frac{1}{2} & -2 & -2 \\ \frac{-5}{2} & -2 & 2 \end{bmatrix} + \begin{bmatrix} 0 & \frac{5}{2} & \frac{3}{2} \\ \frac{-5}{2} & 0 & 3 \\ \frac{-3}{2} & -3 & 0 \end{bmatrix} \quad (iv) A = \begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix} + \begin{bmatrix} 0 & 3 \\ -3 & 0 \end{bmatrix}$$

11. A

12. B

EXERCISE 3.4

$$1. \begin{bmatrix} \frac{3}{5} & \frac{1}{5} \\ -2 & \frac{1}{5} \\ \frac{-2}{5} & \frac{1}{5} \end{bmatrix}$$

$$2. \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$$

$$3. \begin{bmatrix} 7 & -3 \\ -2 & 1 \end{bmatrix}$$

$$4. \begin{bmatrix} -7 & 3 \\ 5 & -2 \end{bmatrix}$$

$$5. \begin{bmatrix} 4 & -1 \\ -7 & 2 \end{bmatrix}$$

$$6. \begin{bmatrix} 3 & -5 \\ -1 & 2 \end{bmatrix}$$

$$7. \begin{bmatrix} 2 & -1 \\ -5 & 3 \end{bmatrix}$$

$$8. \begin{bmatrix} 4 & -5 \\ -3 & 4 \end{bmatrix}$$

$$9. \begin{bmatrix} 7 & -10 \\ -2 & 3 \end{bmatrix}$$

$$10. \begin{bmatrix} 1 & \frac{1}{2} \\ 2 & \frac{3}{2} \end{bmatrix}$$

$$11. \begin{bmatrix} -1 & 3 \\ -1 & 1 \\ 2 & 1 \end{bmatrix}$$

12. Inverse does not exist.

13. $\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$

14. Inverse does not exist.

15. $\begin{bmatrix} \frac{-2}{5} & 0 & \frac{3}{5} \\ \frac{-1}{5} & \frac{1}{5} & 0 \\ \frac{2}{5} & \frac{1}{5} & \frac{-2}{5} \end{bmatrix}$

16. $\begin{bmatrix} 1 & \frac{-2}{5} & \frac{-3}{5} \\ \frac{-2}{5} & \frac{4}{25} & \frac{11}{25} \\ \frac{-3}{5} & \frac{1}{25} & \frac{9}{25} \end{bmatrix}$

17. $\begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{bmatrix}$

18. D

Miscellaneous Exercise on Chapter 3

6. $x = \pm \frac{1}{\sqrt{2}}, y = \pm \frac{1}{\sqrt{6}}, z = \pm \frac{1}{\sqrt{3}}$

7. $x = -1$

9. $x = \pm 4\sqrt{3}$

10. (a) Total revenue in the market - I = ₹ 46000

Total revenue in the market - II = ₹ 53000

(b) ₹ 15000, ₹ 17000

11. $X = \begin{bmatrix} 1 & -2 \\ 2 & 0 \end{bmatrix}$

13. C

14. B

15. C

EXERCISE 4.1

1. (i) 18

2. (i) 1, (ii) $x^3 - x^2 + 2$

5. (i) -12, (ii) 46, (iii) 0, (iv) 5

6. 0

7. (i) $x = \pm\sqrt{3}$, (ii) $x = 2$

8. (B)

EXERCISE 4.2

15. C

16. C