



Twelfth Grade - Matrices and Determinants

1) Which one of the following is 4×1 matrices?

a) $(3\ 4\ 5\ 2)$ b) $\begin{bmatrix} 3 \\ 4 \\ 5 \\ 2 \end{bmatrix}$ c) $\begin{pmatrix} 3 & 4 & 5 & 2 \\ 3 & 3 & 3 & 2 \end{pmatrix}$ d) None of these

- c
- b
- d
- a

2) Find x, y, z, w.

$$\text{If } \begin{pmatrix} x-y & 2x+z \\ 2x-y & 3z+w \end{pmatrix} = \begin{pmatrix} -1 & 5 \\ 0 & 13 \end{pmatrix}$$

- (1, -2, 3, -4)
- (3, 4, 3, 2)
- (-1, -2, -3, -4)
- (1, 2, 3, 4)

3) Find x and y.

$$\text{If } x+y = \begin{pmatrix} 7 & 0 \\ 2 & 5 \end{pmatrix} \text{ and } x-y = \begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$$

a) $\begin{pmatrix} 5 & 0 \\ 1 & 4 \end{pmatrix} \begin{pmatrix} 2 & 0 \\ 1 & 1 \end{pmatrix}$ b) $\begin{pmatrix} -5 & 0 \\ 1 & 4 \end{pmatrix} \begin{pmatrix} 2 & 0 \\ -1 & 1 \end{pmatrix}$ c) $\begin{pmatrix} -5 & 0 \\ -1 & 4 \end{pmatrix} \begin{pmatrix} 2 & 0 \\ -1 & 1 \end{pmatrix}$ d) $\begin{pmatrix} -5 & 0 \\ -1 & -4 \end{pmatrix} \begin{pmatrix} -2 & 0 \\ 1 & 1 \end{pmatrix}$

- b
- d



- a
- c

4) Find a matrix x such that

$$2A + B + X = 0 \quad A = \begin{pmatrix} -1 & 2 \\ 3 & 4 \end{pmatrix} \text{ and } B = \begin{pmatrix} 3 & -2 \\ 1 & 5 \end{pmatrix}$$

a) $\begin{pmatrix} 1 & 2 \\ 7 & 13 \end{pmatrix}$ b) $\begin{pmatrix} -1 & 2 \\ 7 & 13 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 \\ 7 & -13 \end{pmatrix}$ d) $\begin{pmatrix} -1 & -2 \\ -7 & -13 \end{pmatrix}$

- b
- d
- c
- a

5) If $A = \text{diag}(2, -5, 9)$ $B = \text{diag}(1, 1, -4)$ $C = \text{diag}(-6, 3, 4)$, find $A - 2B$.

- $\text{diag}(8, -2, 5)$
- $\text{diag}(-9, 14, -8)$
- $\text{diag}(15, -7, 17)$
- $\text{diag}(0, -7, 17)$

6) Find the value of x, y, z $[xy + 2z - 3] + [y \ 4 \ 5] = [4 \ 9 \ 12]$

$$[xy + 2z - 3] + [y \ 4 \ 5] = [4 \ 9 \ 12]$$

- (1, -3, 10)
- (1, 3, 10)
- (1, 3, -10)
- (-1, -3, -10)



7) Find AB.

$$\text{If } A = \begin{pmatrix} 1 & -2 & 3 \\ 3 & 2 & -1 \end{pmatrix} \text{ and } B = \begin{pmatrix} 2 & 3 \\ -1 & 2 \\ 4 & -5 \end{pmatrix}$$

$$\text{a) } \begin{pmatrix} 16 & -16 \\ 0 & 18 \end{pmatrix} \text{ b) } \begin{pmatrix} 16 & -16 \\ 0 & -18 \end{pmatrix} \text{ c) } \begin{pmatrix} 16 & 16 \\ 0 & 18 \end{pmatrix} \text{ d) } \begin{pmatrix} -16 & -16 \\ 0 & -18 \end{pmatrix}$$

- d
- c
- b
- a

8) Find the values x, if $A^2 = B$.

$$A = \begin{pmatrix} x & 0 \\ 1 & 1 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 0 \\ 5 & 1 \end{pmatrix}$$

- $(\pm 2, 4)$
- $(\pm 1, -4)$
- $(\pm 1, 4)$
- $(\pm 3, 4)$

9) Find Transpose of A.

$$A^T, \text{ If } A = \begin{pmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{pmatrix}$$

$$\text{a) } \begin{pmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{pmatrix} \text{ b) } \begin{pmatrix} \cos \theta & -\sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix} \text{ c) } \begin{pmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix} \text{ d) } \begin{pmatrix} -\cos \theta & -\sin \theta \\ -\sin \theta & -\cos \theta \end{pmatrix}$$

- d
- b
- a
- c



10) Find the values of a and b.

$$\text{If } \begin{pmatrix} a+b & 2 \\ 5 & ab \end{pmatrix} = \begin{pmatrix} 6 & 2 \\ 5 & 8 \end{pmatrix}$$

- (-4, 2)
- (-4, -2)
- (4, 2)
- (4, -2)

11) For what values of x and y the following matrices are equal.

$$A = \begin{pmatrix} 2x+1 & 3y \\ 0 & y^2-5y \end{pmatrix} B = \begin{pmatrix} x+3 & y^2+2 \\ 0 & -6 \end{pmatrix}$$

- (2, 4)
- (2, 3)
- (2, 2)
- (-2, 2)

12) Find the value of x such that

$$(1 \ x \ 1) \begin{pmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \\ x \end{pmatrix} = 0$$

- (-2, -14)
- (2, -14)
- (2, 14)
- (-2, 14)



13) Find the product of the matrices

$$\begin{bmatrix} \cos^2 \theta & \cos \theta \sin \theta \\ \cos \theta \sin \theta & \sin^2 \theta \end{bmatrix} \text{ and } \begin{bmatrix} \cos^2 \phi & \cos \phi \sin \phi \\ \cos \phi \sin \phi & \sin^2 \phi \end{bmatrix}$$

a) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ c) $\begin{bmatrix} -1 & 0 \\ 0 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

- c
- d
- b
- a

14) Find a matrix D such that $CD - AB = 0$

$$A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix} \quad C = \begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$$

a) $\begin{bmatrix} -191 & -110 \\ 77 & 44 \end{bmatrix}$ b) $\begin{bmatrix} 191 & 110 \\ -77 & -44 \end{bmatrix}$ c) $\begin{bmatrix} -191 & -110 \\ -77 & -44 \end{bmatrix}$ d) $\begin{bmatrix} 191 & 110 \\ -77 & 44 \end{bmatrix}$

- a
- b
- d
- c

15) Find A



$$\text{If } \begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 & -10 \\ 1 & -2 & -5 \\ 9 & 22 & 15 \end{bmatrix}$$

$$a. \begin{bmatrix} 1 & 2 & 5 \\ 3 & 4 & 0 \end{bmatrix} \quad b. \begin{bmatrix} -1 & -2 & -5 \\ -3 & -4 & 0 \end{bmatrix} \quad c. \begin{bmatrix} 1 & -2 & -5 \\ 3 & 4 & 0 \end{bmatrix} \quad d. \begin{bmatrix} -1 & -2 & 5 \\ 3 & 4 & 0 \end{bmatrix}$$

- d
- a
- b
- c

16) There are two families A and B. There are 4 men, 6 women and 2 children in family A and 2 men, 2 women and 4 children in family B. The Recommended daily allowance for calories is, man : 2400, women : 1900, Children : 1800 and for proteins is, man : 55, women : 45 and Child : 33

$$a) \begin{pmatrix} 24000 & 500 \\ 15589 & 234 \end{pmatrix} \quad b) \begin{pmatrix} 23400 & 456 \\ 34216 & 342 \end{pmatrix} \quad c) \begin{pmatrix} 24600 & 556 \\ 15800 & 332 \end{pmatrix} \quad d) \begin{pmatrix} 23450 & 543 \\ 12312 & 332 \end{pmatrix}$$

- d
- c
- b
- a

17) Use matrix multiplication to divide \$30,000 in two parts such that the total annual interest at 9% on the first part and 11% on the second part amounts to \$3060

- 6000 and 24000
- 15000 and 15000
- 16000 and 12000
- 12000 and 18000

18) Find x such that $(xI + yA)^2 = A$



$$\text{If } A = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$$

- $\pm y$
- y
- $-y$
- 1

19) Find the values of ?

$$\text{If } A = \begin{pmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{pmatrix} \text{ and satisfying the equation } A^T + A = I$$

- ?
- $-?$
- $3?$
- $2?$

20) Find AB

$$\text{If } A = \begin{pmatrix} 4 & 9 \\ 6 & 3 \\ 2 & 5 \end{pmatrix} \text{ and } B = \begin{pmatrix} 8 & 1 & 3 \\ 4 & 7 & 6 \end{pmatrix}$$

$$\text{a) } \begin{pmatrix} -68 & -67 & -66 \\ -60 & -27 & -36 \\ -36 & -37 & -36 \end{pmatrix} \text{ b) } \begin{pmatrix} -68 & 67 & 66 \\ 60 & -27 & 36 \\ 36 & 37 & -36 \end{pmatrix} \text{ c) } \begin{pmatrix} -68 & -67 & -66 \\ 60 & 27 & 36 \\ 36 & 37 & 36 \end{pmatrix} \text{ d) } \begin{pmatrix} 68 & 67 & 66 \\ 60 & 27 & 36 \\ 36 & 37 & 36 \end{pmatrix}$$

- c
- a
- b
- d



21) Find AB

$$\text{If } A = \begin{pmatrix} 0 & 1 & 3 \\ 6 & 1 & 7 \\ 9 & 3 & 8 \\ 5 & 2 & 4 \end{pmatrix} \text{ and } B = \begin{pmatrix} 7 & 4 \\ 5 & 8 \\ 7 & 6 \end{pmatrix}$$

$$\text{a) } \begin{pmatrix} 26 & 26 \\ 96 & 74 \\ 134 & 108 \\ 73 & 60 \end{pmatrix} \quad \text{b) } \begin{pmatrix} 26 & 26 \\ -96 & 74 \\ 134 & -108 \\ 73 & 60 \end{pmatrix} \quad \text{c) } \begin{pmatrix} -26 & 26 \\ 96 & -74 \\ -134 & 108 \\ 73 & 60 \end{pmatrix} \quad \text{d) } \begin{pmatrix} -26 & 26 \\ -96 & 74 \\ 134 & -108 \\ 73 & 60 \end{pmatrix}$$

- b
- c
- d
- a

22) Using the equation system

$$6x? + 3x? + 1x? = 22$$

$$6x? + 4x? - 2x? = 12$$

$$4x? - 3x? + 5x? = 10. \text{ Find } x?, x?, x?$$

$$\text{a) } \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix} \quad \text{b) } \begin{pmatrix} 1 \\ 2 \\ 1 \end{pmatrix} \quad \text{c) } \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \quad \text{d) } \begin{pmatrix} 5 \\ 4 \\ 1 \end{pmatrix}$$

- b
- c
- a
- d

23) Find the inverse of



$$A = \begin{pmatrix} 6 & 3 & 1 \\ 1 & 4 & -2 \\ 4 & -1 & 5 \end{pmatrix}$$

$$\text{a) } \begin{pmatrix} 0.3462 & -0.3077 & -0.1923 \\ -0.2500 & -0.5000 & 0.2500 \\ -0.3263 & -0.3462 & 0.4038 \end{pmatrix} \quad \text{b) } \begin{pmatrix} 0.3462 & -0.3077 & -0.1923 \\ -0.2500 & -0.5000 & -0.2500 \\ -0.3263 & 0.3462 & 0.4038 \end{pmatrix}$$

$$\text{c) } \begin{pmatrix} 0.3462 & -0.3077 & -0.1923 \\ -0.2500 & 0.5000 & 0.2500 \\ -0.3263 & 0.3462 & 0.4038 \end{pmatrix} \quad \text{d) } \begin{pmatrix} -0.3462 & -0.3077 & -0.1923 \\ -0.2500 & -0.5000 & 0.2500 \\ -0.3263 & 0.3462 & 0.4038 \end{pmatrix}$$

- a
- c
- b
- d

24) Find SA

$$\text{If } s = 2 \text{ and } A = \begin{pmatrix} 4 & 8 & 3 \\ 2 & 1 & -2 \\ 6 & 5 & 7 \end{pmatrix}$$

$$\text{a) } \begin{pmatrix} -8 & -16 & 6 \\ 4 & 2 & -4 \\ 12 & 10 & 14 \end{pmatrix} \quad \text{b) } \begin{pmatrix} -8 & 16 & 6 \\ 4 & -2 & -4 \\ 12 & 10 & -14 \end{pmatrix} \quad \text{c) } \begin{pmatrix} 8 & -16 & 6 \\ 4 & -2 & -4 \\ 12 & -10 & 14 \end{pmatrix} \quad \text{d) } \begin{pmatrix} 8 & 16 & 6 \\ 4 & 2 & -4 \\ 12 & 10 & 14 \end{pmatrix}$$

- b
- d
- c
- a

25) We can say A is



$$\text{If } A = \begin{pmatrix} 10 & 8 \\ 4 & 5 \end{pmatrix}$$

- Non - Singular
- None of these
- Non - Convertible
- Singular

26) We can say A is

$$\text{If } A = \begin{vmatrix} 6 & 1 & 7 \\ 9 & 3 & 8 \\ 5 & 2 & 4 \end{vmatrix}$$

- Non - Singular
- Non - convertible
- Singular
- None of these

27) The determinant of the transpose A? is the same as

- The determinant of A
- The determinant of A'
- The transpose A
- None of these

28) Interchange of any two rows (or any two) columns will

- Change the algebraic sign of the determinant
- Not change the algebraic sign of the determinant
- Determinant becomes zero
- None of these



29) Multiplication of any one row (or one column) by a scalar k will

- Change the value of the determinant k -fold
- None of these
- Matrix will diminish
- Not change the value of the determinant k - fold

30) The addition of a multiple of any row (column) to another row (column) will leave

- The value of the determinant changes
- The value of the determinant becomes 1
- The value of the determinant unchanged
- None of these