Twelfth Grade - Matrices and Determinants

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

a)
$$(3452)$$
 b) $\begin{bmatrix} 3\\4\\5\\2 \end{bmatrix}$ c) $\begin{pmatrix} 3452\\3332 \end{pmatrix}$ d) None of these

- 0
- a
- d
- h

2) Find x, y, z, w.

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

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

3) Find x and y.

If
$$x+y = \begin{pmatrix} 7 & 0 \\ 2 & 5 \end{pmatrix}$$
 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) $\begin{pmatrix} -5 & 0 \\ -1 & -4 \end{pmatrix} \begin{pmatrix} -2 & 0 \\ 1 & 1 \end{pmatrix}$

- a
- h

- C
- 0

4) Find a matrix x such that

$$2A + B + X = 0 A = \begin{pmatrix} -1 & 2 \\ 3 & 4 \end{pmatrix} \text{ and } B = \begin{pmatrix} 3 & -2 \\ 1 & 5 \end{pmatrix}$$
$$a) \begin{pmatrix} 1 & 2 \\ 7 & 13 \end{pmatrix} b) \begin{pmatrix} -1 & 2 \\ 7 & 13 \end{pmatrix} c) \begin{pmatrix} 1 & 2 \\ 7 & -13 \end{pmatrix} d) \begin{pmatrix} -1 & -2 \\ -7 & -13 \end{pmatrix}$$

- a
- d
- C
- b

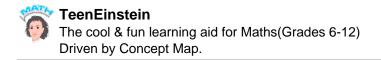
5) If
$$A = \text{diag}(2, -5, 9) B = \text{diag}(1, 1, -4) C = \text{diag}(-6, 3, 4)$$
, find $A - 2B$.

- diag (0, -7, 17)
- diag (15, -7, 17)
- diag (-9, 14, -8)
- diag (8, -2, 5)

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

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

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



7) Find AB.

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

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

- a
- b
- 0
- C

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

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

- (+2 4)
- (±1, 4)
- (±1.-4
- (±3, 4)

9) Find Transpose of A.

$$\begin{split} A^T, & \text{If } A = \begin{pmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{pmatrix} \\ a) \begin{pmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{pmatrix} b) \begin{pmatrix} \cos\theta & -\sin\theta \\ -\sin\theta & \cos\theta \end{pmatrix} c) \begin{pmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{pmatrix} d) \begin{pmatrix} -\cos\theta & -\sin\theta \\ -\sin\theta & -\cos\theta \end{pmatrix} \end{split}$$

- 8
- h
- C
- d

10) Find the values of a and b.

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

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

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

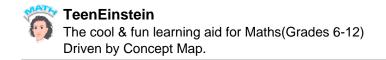
$$A = \begin{pmatrix} 2x+1 & 3y \\ 0 & y^2 - 5y \end{pmatrix} B = \begin{pmatrix} x+3 & y^2 + 2 \\ 0 & -6 \end{pmatrix}$$

- (2, 4)
- (-2, 2)(2, 3)
- (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
- k
- a
- d

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

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

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

- a
- b
- d
- C

15) Find A

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

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

- b
- c
- a
- d
- 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

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

- 0
- a
- C
- h
- 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
 - 12000 and 18000
 - 6000 and 24000
 - 16000 and 12000
 - 15000 and 15000
- 18) Find x such that $(xI + yA)^2 = A$

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

- 1
- -v
- y
- ±y

19) Find the values of?

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

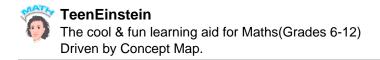
- -?
- 2?
- ?
- 3?

20) Find AB

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

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

- b
- a
- d
- C



21) Find AB

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

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

- b
- (
- a
- C

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

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

$$4x? - 3x? + 5x? = 10$$
. Find $x?$, $x?$, $x?$

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

- C
- b
- a
- C

23) Find the inverse of

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

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

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

24) Find SA

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

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

25) We can say A is

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

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

26) We can say A is

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

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

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

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

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

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

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

- Not change the value of the determinant k fold
- · None of these
- · Matrix will diminish
- 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 becomes 1
 - · None of these
 - The value of the determinant unchanged
 - The value of the determinant changes