



MATHS

BOOKS - INDEPENDENTLY PUBLISHED

MATHS (ENGLISH)

MATRICES

Examples

1. Evaluate x and y if

$$\begin{bmatrix} 5 & -3 \\ x & 4 \end{bmatrix} = \begin{bmatrix} y - 3 & -3 \\ 2x + 2 & 4 \end{bmatrix}.$$



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2. Simplify : $3 \begin{bmatrix} -2 & 3 \\ 1 & 5 \\ -4 & 3 \end{bmatrix} - 2 \begin{bmatrix} 3 & -1 \\ 2 & 1 \\ -4 & 6 \end{bmatrix}$



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3. Solve the matrix equation :

$$2x + \begin{bmatrix} -3 & 2 & 6 \\ 5 & -1 & 0 \\ 3 & -6 & -2 \end{bmatrix} = \begin{bmatrix} 5 & -8 & -4 \\ 1 & 3 & 10 \\ -5 & 8 & 0 \end{bmatrix}.$$



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4. Evaluate $AB = \begin{bmatrix} 3 & -1 \\ 3 & 5 \\ -2 & 1 \end{bmatrix} \begin{bmatrix} 1 & -2 \\ 5 & -3 \end{bmatrix}$. A is

3 by 2, and B is 2 by 2.



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5. The identity matrix $I_2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$. If $A = \begin{bmatrix} 2 & -3 \\ 5 & 1 \end{bmatrix}$, evaluate $AI_2 = I_2A = A$



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6. If $A = \begin{bmatrix} -2 & 5 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 0 \\ 3 & -5 \end{bmatrix}$,

evaluate AB and BA .



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7. Write an expression for the determinant of

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



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8. Solve for x :
$$\begin{vmatrix} x & x \\ 8 & x \end{vmatrix} = \begin{vmatrix} 7 & -2 & 1 \\ 0 & 3 & -1 \\ 5 & -4 & 2 \end{vmatrix}.$$



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9. If $A = \begin{bmatrix} 7 & -3 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 \\ 2 \end{bmatrix}$ solve for X when $AX=B$.



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10. Solve the system
$$\begin{aligned} x - y + 2z &= -3 \\ 2x + y - z &= 0 \\ -x + 2y - 3z &= 7 \end{aligned}$$



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Exercises

1.
$$\begin{bmatrix} 1 & 3 \\ -2 & 4 \end{bmatrix} + \begin{bmatrix} 11 & 5 \\ -6 & 12 \end{bmatrix} = K \begin{bmatrix} 3 & 2 \\ J & M \end{bmatrix}.$$

Find the value of $K+J+M$.

A. 2

B. 4

C. 6

D. 7

Answer: C



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2. Evaluate x and y if

$$\begin{bmatrix} x & 2 \\ -3 & y \end{bmatrix} = 2 \begin{bmatrix} x^2 & 1 \\ -\frac{3}{2} & 3y - 5 \end{bmatrix}.$$

A. $x = 0, y = 2$

B. $x = 1, y = 2$

C. $x = -1, 1, y = \frac{5}{3}$

D. $x = 0, \frac{1}{2}, y = 2$

Answer: D



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3. Solve for X :

$$\begin{bmatrix} 1 & 2 & -3 \\ 2 & 1 & 3 \end{bmatrix} - X = \begin{bmatrix} 5 & 1 & 8 \\ -6 & 0 & 5 \end{bmatrix}.$$

A. $\begin{bmatrix} 4 & 1 & -11 \\ -8 & 1 & -2 \end{bmatrix}$

B. $\begin{bmatrix} -4 & 1 & -11 \\ 8 & 1 & -2 \end{bmatrix}$

C. $\begin{bmatrix} -5 & -2 & 24 \\ 12 & 0 & -15 \end{bmatrix}$

D. $\begin{bmatrix} 5 & 2 & -24 \\ -12 & 0 & 15 \end{bmatrix}$

Answer: B



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4.

Use

A

$$A = [-2, -1, 5, 9] \text{ and } B = \begin{bmatrix} 0 & -5 \\ 3 & -2 \\ 4 & 0 \\ -6 & 1 \end{bmatrix}$$

for question 4

The product $AB =$

$$\text{A. } \begin{bmatrix} 0 & 10 \\ -3 & 2 \\ 20 & 0 \\ -54 & 9 \end{bmatrix}$$

B. $[-37 \ 21]$

C. $\begin{bmatrix} 10 \\ -2 \\ 20 \\ -45 \end{bmatrix}$

D. $\begin{bmatrix} 0 \\ 6 \\ 0 \\ -54 \end{bmatrix}$

Answer: B



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5. The first row, second column of the product

$$\begin{bmatrix} x & 1 \\ 2 & -3 \end{bmatrix} \begin{bmatrix} 5 & -x \\ 2 & 1 \end{bmatrix} \text{ is}$$

A. $-5x - 3$

B. $-x - 3$

C. $1 - x^2$

D. $4x$

Answer: C



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6. If $A = \begin{bmatrix} -3 & 1 & 6 \\ 2 & -5 & 0 \\ 1 & -3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 7 \\ -4 & 2 \\ -1 & -5 \end{bmatrix}$

and $AX=B$, then the size of X is

A. 3 rows, 3 columns

B. 3 rows, 2 columns

C. 2 rows, 2 columns

D. 2 rows, 3 columns

Answer: B



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7. The chart below shows the number of small and large packages of a certain brand of cereal that were bought over a three - day period.

The price of a small box of this brand is \$ 2.99, and the price of a large box is \$3.99. Which of the following matrix expression represents the income, in dollars, received from the sale of cereal each of the three days ?

	Day 1	Day 2	Day 3
Large	75	82	57
Small	43	36	50

A. $\begin{bmatrix} 75 & 82 & 57 \\ 43 & 36 & 50 \end{bmatrix} \begin{bmatrix} 2.99 & 3.99 \end{bmatrix}$

B. $\begin{bmatrix} 75 & 43 \\ 82 & 36 \\ 57 & 50 \end{bmatrix} \begin{bmatrix} 3.99 \\ 2.99 \end{bmatrix}$

C. $\begin{bmatrix} 75 & 82 & 57 \\ 43 & 36 & 50 \end{bmatrix} \begin{bmatrix} 2.99 \\ 3.99 \end{bmatrix}$

D. $\begin{bmatrix} 2.99 \\ 3.99 \end{bmatrix} \begin{bmatrix} 75 & 43 \\ 82 & 36 \\ 57 & 50 \end{bmatrix}$

Answer: B



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8. The determinant of $\begin{bmatrix} p & 3 \\ -2 & 1 \end{bmatrix}$ is

A. $p-6$

B. $p+6$

C. $3p-2$

D. $3-2p$

Answer: B



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9. Find all values of x for which

$$\begin{vmatrix} 2 & -1 & 4 \\ 3 & 0 & 5 \\ 4 & 1 & 6 \end{vmatrix} = \begin{vmatrix} x & 4 \\ 5 & x \end{vmatrix}.$$

A. ± 3.78

B. ± 4.47

C. ± 5.12

D. ± 6.19

Answer: B



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10. If $X \begin{bmatrix} -7 & 2 \\ 0 & -5 \end{bmatrix} = \begin{bmatrix} 2 & -3 \\ 5 & 4 \end{bmatrix}$, then X

A. $\begin{bmatrix} -\frac{2}{7} & -\frac{3}{4} \\ 0 & -\frac{5}{4} \end{bmatrix}$

B. $\begin{bmatrix} -\frac{7}{2} & -\frac{2}{3} \\ 0 & -\frac{4}{5} \end{bmatrix}$

C. $\begin{bmatrix} -\frac{2}{7} & \frac{17}{35} \\ -\frac{5}{7} & -\frac{38}{351} \end{bmatrix}$

D. $\begin{bmatrix} -14 & -6 \\ 0 & -20 \end{bmatrix}$

Answer: C



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11. Find the matrix equation that represents

the system
$$\begin{cases} 2x - 3 = 3y \\ y - 5x = 15 \end{cases}$$

A.
$$\begin{bmatrix} 2 & -3 \\ 1 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 14 \end{bmatrix}$$

B.
$$\begin{bmatrix} 2 & = 3 \\ -5 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 14 \end{bmatrix}$$

C.
$$\begin{bmatrix} x \\ y \end{bmatrix} \begin{bmatrix} 2 & -3 \\ -5 & 1 \end{bmatrix} = \begin{bmatrix} 3 \\ 14 \end{bmatrix}$$

D.
$$\begin{bmatrix} 3 \\ 13 \end{bmatrix} \begin{bmatrix} x & y \end{bmatrix} = \begin{bmatrix} 2 & -3 \\ 5 & 1 \end{bmatrix}$$

Answer: B



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12. Find $\begin{bmatrix} x \\ y \end{bmatrix}$ if $\begin{bmatrix} 3 & 2 \\ -1 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -5 \\ 4 \end{bmatrix}$.

A. $[-2 \quad 0.5]$

B. $\begin{bmatrix} -5/6 \\ 1 \end{bmatrix}$

C. $[-1 \quad 3/4]$

D. $\begin{bmatrix} -2 \\ 1/2 \end{bmatrix}$

Answer: D



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