

Precalculus · Matrices and Matrix Operations · Test Answer Key

Common Core N-VM.C.6, N-VM.C.7, N-VM.C.8, N-VM.C.9, N-VM.C.10 · mathovore.fr

This precalculus matrices test answer key gives the full solution and the scoring guide for each of the 8 test questions on matrices and matrix operations.

Worked solutions and a scoring guide for the 20-point matrices test. Award points as described, and accept any correct method for finding entries, as long as the final matrices match.

Precalculus Common Core: N-VM.C.6 · N-VM.C.7 · N-VM.C.8 · N-VM.C.9 · N-VM.C.10

Precalculus Matrices Test Answer Key: questions 1-5

Question 1: Write a data matrix (2 points)

- a. The matrix is 2×3 : see the figure.
- b. The entry is **6**: Ethan had 6 assists.

	Pts	Reb	Ast
Aisha	18	7	4
Ethan	12	9	6

The data as a 2×3 matrix.

Scoring: 1 point for the matrix with its dimensions; 1 point for the entry 6 with its meaning.

Question 2: Add and scale matrices (2 points)

- a. Add matching entries.
- b. $3A$ has entries 12, -6 , 3, 9 and $2B$ has entries 0, 10, -6 , 4. Subtract matching entries.

$$A+B = \begin{bmatrix} 4 & 3 \\ -2 & 5 \end{bmatrix} \quad 3A-2B = \begin{bmatrix} 12 & -16 \\ 9 & 5 \end{bmatrix}$$

The two results.

Scoring: 1 point for each correct matrix.

Question 3: Solve for unknowns (2 points)

Compare entries: $2a+4=10$ gives $a=3$; $3+c=8$ gives $c=5$; $b+5=9$ gives $b=4$. Check the last entry: $-1+2=1$.

$$a=3, b=4, c=5$$

Scoring: 1 point for two correct values; 1 point for all three values.

Question 4: Multiply matrices (3 points)

a. R is 2×3 and S is 3×2 , so RS is 2×2 .

b. Entries: $c_{11}=2 \cdot 1 + 1 \cdot 0 + 0 \cdot 3 = 2$ $c_{12}=2 \cdot 2 + 1 \cdot (-1) + 0 \cdot 5 = 3$ $c_{21}=(-1) \cdot 1 + 3 \cdot 0 + 4 \cdot 3 = 11$
 $c_{22}=(-1) \cdot 2 + 3 \cdot (-1) + 4 \cdot 5 = 15$

$$RS = \begin{bmatrix} 2 & 3 \\ 11 & 15 \end{bmatrix}$$

The product RS .

Scoring: 1 point for the dimensions; 2 points for RS (1 point for two or three correct entries, 2 points for all four).

Question 5: Order of multiplication (2 points)

AB and BA are computed row by column.

$$AB = \begin{bmatrix} 4 & 8 \\ 6 & 0 \end{bmatrix} \quad BA = \begin{bmatrix} 2 & 13 \\ 4 & 2 \end{bmatrix}$$

The two products.

They are not equal, so $AB \neq BA$.

Scoring: 1 point for both products correct; 1 point for the conclusion that they differ.

Precalculus Matrices Test Answer Key: questions 6-8

Question 6: Determinants and invertibility (2 points)

a. $7 \cdot 2 - 3 \cdot 4 = 14 - 12 = 2 \neq 0$: **determinant 2, invertible**

b. $6 \cdot 3 - (-9)(-2) = 18 - 18 = 0$: **determinant 0, no inverse**

Scoring: 1 point for each part (determinant and conclusion both required).

Question 7: Find and verify an inverse (3 points)

- a. $5 \cdot 2 - 3 \cdot 3 = 1$
- b. Swap 5 and 2, negate the 3s, and multiply by $\frac{1}{1}$.
- c. Entries: $c_{11} = 5 \cdot 2 + 3 \cdot (-3) = 1$ $c_{12} = 5 \cdot (-3) + 3 \cdot 5 = 0$ $c_{21} = 3 \cdot 2 + 2 \cdot (-3) = 0$ $c_{22} = 3 \cdot (-3) + 2 \cdot 5 = 1$

$$M^{-1} = \begin{bmatrix} 2 & -3 \\ -3 & 5 \end{bmatrix} M M^{-1} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

The inverse and the check.

Scoring: 1 point for the determinant; 1 point for the inverse; 1 point for a complete verification that gives the identity matrix.

Question 8: Smoothie stand revenue (4 points)

- a. S is 2×3 and P is 3×1 , so SP is 2×1 ; each entry is the revenue for one day.
- b. Saturday: $30 \cdot 3 + 45 \cdot 4 + 20 \cdot 5 = 90 + 180 + 100 = 370$. Sunday:
 $25 \cdot 3 + 50 \cdot 4 + 35 \cdot 5 = 75 + 200 + 175 = 450$.
- c. $370 + 450 = \text{\$820}$

$$SP = \begin{matrix} \text{Sat} \\ \text{Sun} \end{matrix} \begin{bmatrix} 370 \\ 450 \end{bmatrix}$$

Revenue in dollars

Revenue by day.

Scoring: 1 point for the dimensions and meaning; 2 points for SP (1 point for one correct entry); 1 point for the total.

Scoring summary

Total
20 points: add the points of every question of this precalculus matrices test answer key.

How to use this precalculus matrices test answer key

Use this precalculus matrices test answer key to score the test fairly and to see which skills need more practice.

