

Precalculus · Solving Systems with Matrices · Test

Common Core A-REI.C.8, A-REI.C.9, N-VM.C.11, N-VM.C.12 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This precalculus matrix systems test checks solving systems with matrices in 45 minutes, with 8 questions for a total of 20 points.

This test has 8 questions worth 20 points in total and should take about 45 minutes. It covers matrix equations, 2 by 2 inverses, solving systems with matrices and transformations of the plane. Show all work. A calculator is allowed.

Test information

- **Grade:** Precalculus
- **Chapter:** Solving Systems with Matrices
- **Common Core:** A-REI.C.8, A-REI.C.9, N-VM.C.11, N-VM.C.12
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 3 pts; Question 3: 3 pts; Question 4: 2 pts; Question 5: 2 pts; Question 6: 3 pts; Question 7: 2 pts; Question 8: 3 pts)

Precalculus Matrix Systems Test: questions 1-5

Question 1: Matrix form of a system (2 points)

Consider the system $5x - 2y = 9$, $x + 3y = -5$.

- Write the system as a matrix equation $AX = B$. (1 point)
- Find $\det A$ and state whether A has an inverse. (1 point)

Question 2: Inverse of a matrix (3 points)

Matrix A has rows $\begin{bmatrix} 4 & 5 \end{bmatrix}$ and $\begin{bmatrix} 3 & 4 \end{bmatrix}$.

- Find $\det A$. (1 point)
- Find A^{-1} . (1 point)
- Show that AA^{-1} is the identity matrix. (1 point)

Question 3: Solve a system with matrices (3 points)

Consider the system $3x+2y=4$, $7x+5y=9$.

- Find the inverse of the coefficient matrix. (1 point)
- Solve the system using matrices. (2 points)

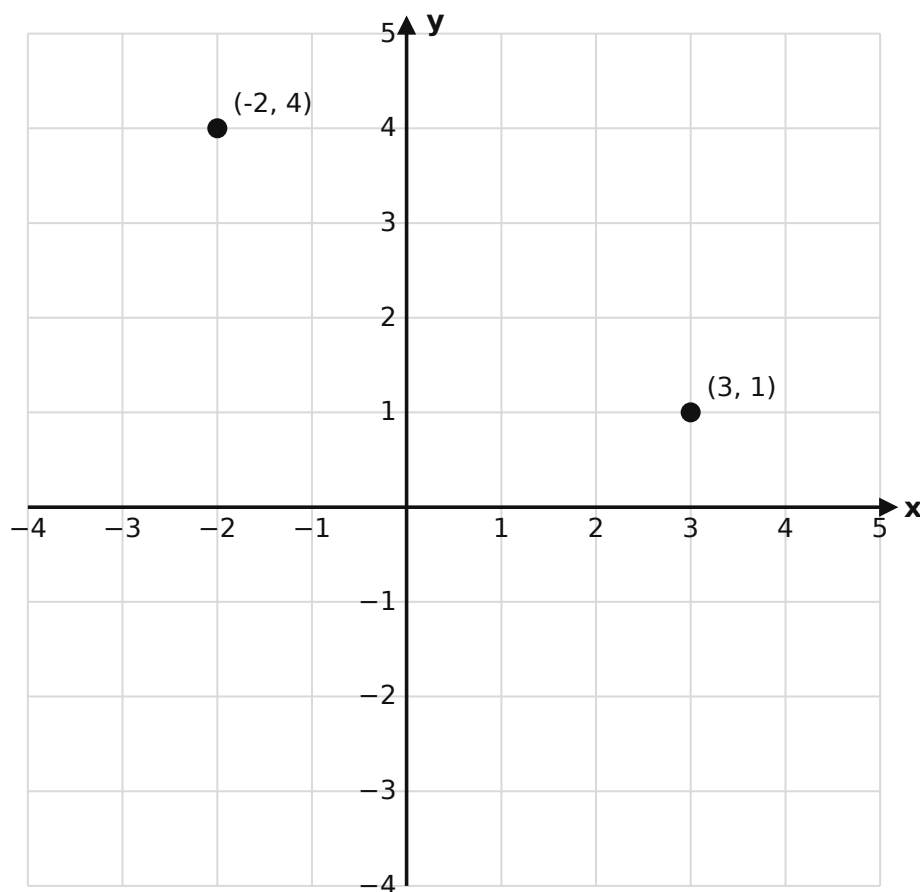
Question 4: Singular matrices (2 points)

Matrix C has rows 2, k and 3, 6.

- Find the value of k for which C has no inverse. (1 point)
- For that k , does $2x+ky=6$, $3x+6y=9$ have no solution, one solution or infinitely many? Explain. (1 point)

Question 5: Transforming points (2 points)

Matrix Q has rows 0, 1 and -1 , 0. The points $(3, 1)$ and $(-2, 4)$ are plotted.



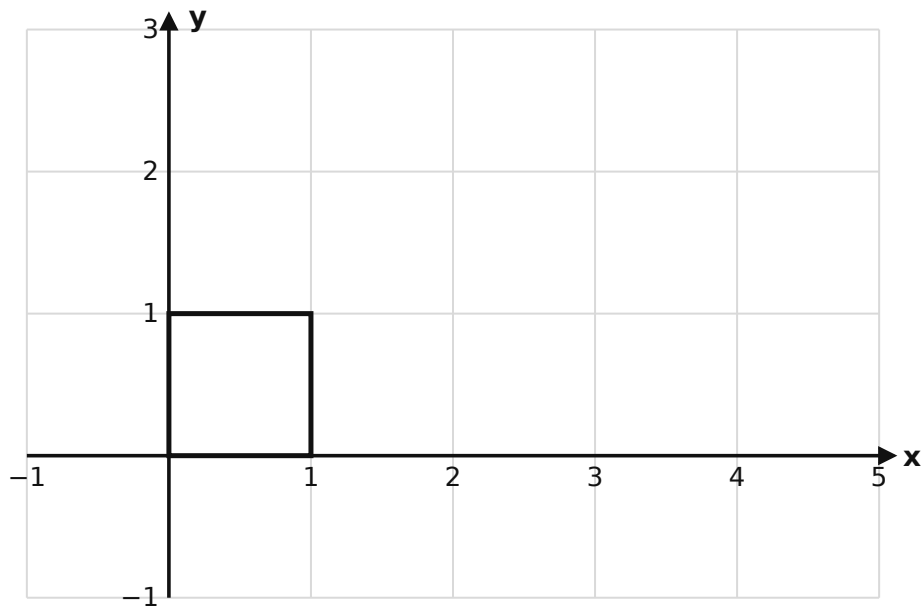
Two points before the transformation.

- Find the images of the two points under Q . (1 point)
- Describe the transformation geometrically. (1 point)

Precalculus Matrix Systems Test: questions 6-8

Question 6: Image of the unit square (3 points)

The unit square is shown. Matrix N has rows 3, 1 and 0, 2.

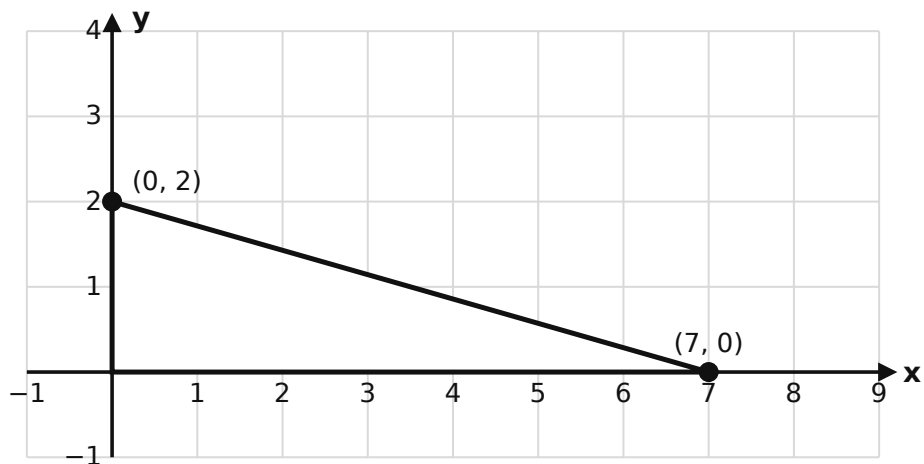


The unit square.

- Find the images of the four vertices under N . (2 points)
- Find the area of the image. (1 point)

Question 7: Area under a matrix (2 points)

The triangle shown has area 7. It is transformed by the matrix T with rows 2, -1 and 3, 4.



Triangle with area 7.

- a. Find $\det T$. (1 point)
- b. Find the area of the image triangle. (1 point)

Question 8: Ticket prices (3 points)

At the school play, Noah buys 2 adult tickets and 3 student tickets for \$36. Sofia buys 3 adult tickets and 2 student tickets for \$39.

- a. Write a matrix equation for this situation. (1 point)
- b. Find the price of each type of ticket using matrices. (2 points)

How to use this precalculus matrix systems test

Take this precalculus matrix systems test without notes, then grade it with the test answer key out of 20 points.

