

Precalculus · Solving Systems with Matrices · Quiz

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 quiz asks 10 multiple-choice questions on solving systems with matrices, and each answer comes with a short explanation.

Ten quick multiple-choice questions on determinants, inverses, the solution $X = A^{-1}B$, singular systems and the effect of a matrix on the plane. Choose one answer each, then read the explanation to find which common slip each wrong option stands for.

Precalculus Common Core: A-REI.C.8 · A-REI.C.9 · N-VM.C.11 · N-VM.C.12

Questions

Question 1

Find the determinant of the matrix with rows 3, 4 and 2, 5.

- A. 23
- B. -7
- C. 14
- D. 7

Question 2

Which matrix is the inverse of the matrix with rows 5, 2 and 7, 3?

- A. rows 3, 2 and 7, 5
- B. rows -3, 2 and 7, -5
- C. rows 3, -2 and -7, 5
- D. rows 5, -2 and -7, 3

Question 3

A square matrix has determinant 0. What does this tell you?

- A. The matrix is the identity
- B. The system always has exactly one solution
- C. All entries of the matrix are 0
- D. The matrix has no inverse

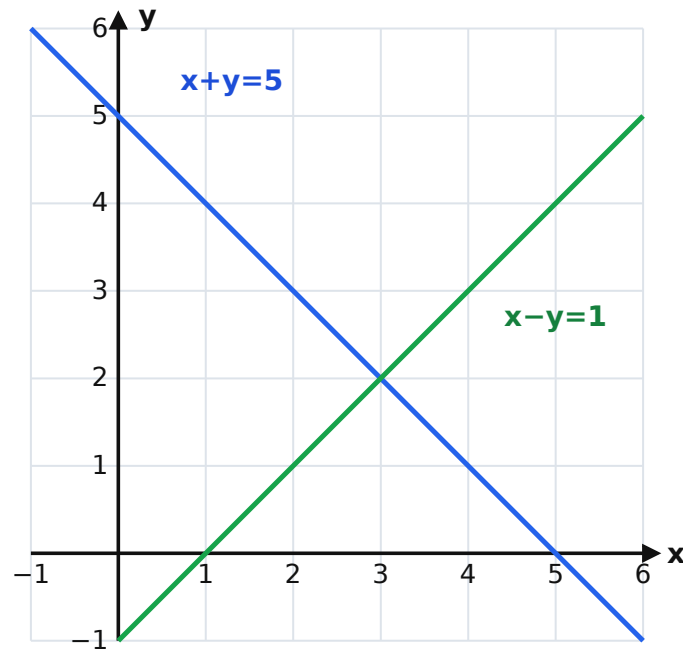
Question 4

For the matrix equation $AX=B$ with A invertible, which expression gives X ?

- A. BA^{-1}
- B. $A^{-1}B$
- C. AB^{-1}
- D. $B-A$

Question 5

The graph shows the system $x+y=5$, $x-y=1$. Which pair is the solution?



Two lines of a system.

- A. (2, 3)
- B. (3, 2)
- C. (1, 4)
- D. (3, -2)

Question 6

A matrix with rows 2, 0 and 1, 3 maps the unit square to the orange parallelogram. What is its area?

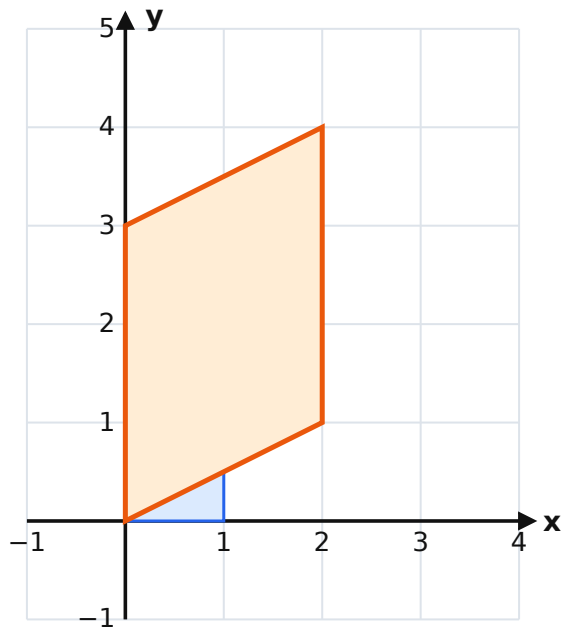


Image of the unit square.

- A. 6
- B. 5
- C. 3
- D. 7

Question 7

The matrix with rows 1, 2 and 0, 3 acts on the point $(2, -3)$. What is the image?

- A. $(-4, -9)$
- B. $(2, -5)$
- C. $(-4, 9)$
- D. $(8, -9)$

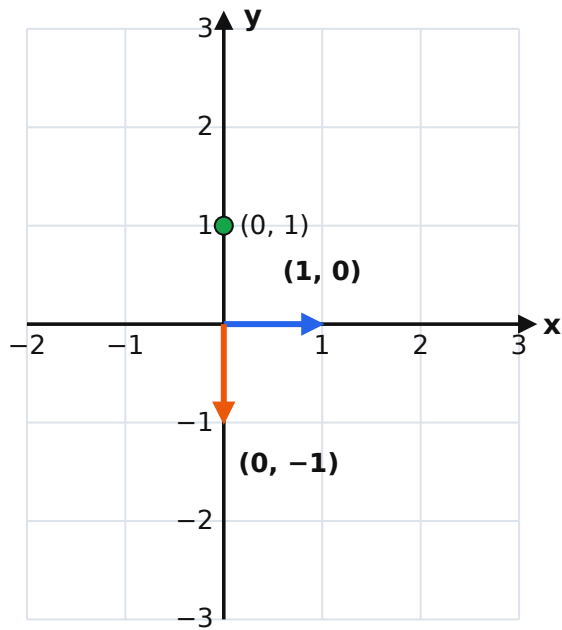
Question 8

A matrix has determinant -3 . It transforms a region of area 5. What is the area of the image?

- A. -15
- B. $\frac{5}{3}$
- C. 2
- D. 15

Question 9

A matrix keeps $(1, 0)$ fixed and sends $(0, 1)$ to $(0, -1)$. Which matrix is it?



Where the two basis points land.

- A. rows 1, 0 and 0, -1
- B. rows -1, 0 and 0, 1
- C. rows 1, 0 and 0, 1
- D. rows 0, 1 and 1, 0

Question 10

The system $x+2y=4$, $3x+6y=12$ has $\det A=0$. How many solutions does it have?

- A. Exactly one
- B. No solution
- C. Infinitely many
- D. Exactly two

Answer key

1. **D** - The determinant is $ad-bc=15-8=7$. Adding the products (23) is the usual slip.
2. **C** - The determinant is $15-14=1$. Swap 5 and 3, negate 2 and 7. Keeping the diagonal in place is the common error.
3. **D** - A zero determinant makes $\frac{1}{\det A}$ undefined, so no inverse exists; the system has no solution or infinitely many.
4. **B** - Multiply both sides on the left by A^{-1} . Matrix multiplication is not commutative, so BA^{-1} is a different product.
5. **B** - $3+2=5$ and $3-2=1$. Swapping the coordinates gives (2, 3), which fails the second equation.
6. **A** - The area scale factor is $|\det|=|2\cdot3-0\cdot1|=6$. Adding the diagonal entries (5) is not the determinant.
7. **A** - First coordinate $1\cdot2+2\cdot(-3)=-4$; second $0\cdot2+3\cdot(-3)=-9$. Using the columns as rows gives (2, -5).
8. **D** - Area is multiplied by $|\det|=3$, giving 15. Area is never negative; the sign only records a flip.
9. **A** - The columns are the images: first column (1, 0), second column (0, -1). The result reflects across the x -axis.
10. **C** - The second equation is 3 times the first, so the lines coincide. A zero determinant does not always mean no solution.

How does this quiz work?

Read each question, choose one answer among A, B, C and D, then check it: a short explanation appears after every answer. Your score out of 10 is shown at the end, and you can restart the quiz as often as you like.

What should you review before the quiz?

Reread the key facts of the lesson and the worked example. If a question is hard, go back to the matching part of the lesson, then try the quiz again. Write your work on scrap paper: most mistakes come from skipping a step, not from the idea itself.

Remember:

- A system of linear equations can be written as $AX=B$.
- For a 2×2 matrix, $\det A=ad-bc$ and $A^{-1}=\frac{1}{ad-bc}$ times the matrix with rows d , $-b$ and $-c$, a .
- If $\det A\neq 0$, then $X=A^{-1}B$ is the only solution; if $\det A=0$, there is no inverse.
- The columns of a 2×2 matrix are the images of (1, 0) and (0, 1).
- A transformation by M multiplies every area by $|\det M|$.

How to use this precalculus matrix systems quiz

Retake this precalculus matrix systems quiz until every answer is right, then move on to the worksheet and the test.

