Systems, Matrices, and Determinants

Matrix methods, determinants, and systems of linear equations.

Name _____ Date _____

32 main · 2-up grid · 2 pages

Completion Reward

Shown here as a small pack artifact, not a preview destination.

1. How many rows and columns does a 2 x 3 matrix have?

col 1	col 2	col 3
1	2	3
4	5	6

A 2 x 3 matrix has 2 horizontal rows and 3 vertical columns.

A. 3 rows and 2 columns
B. 2 rows and 3 columns
C. 2 rows and 2 columns
D. 3 rows and 3 columns

2. What does an augmented matrix represent?

x	y	const
1	2	5
3	-1	4

The coefficient entries stay in their variable columns, and the constants appear in the final augmented column.

A. A system of equations with coefficients and constants
B. Only a graph of one line
C. A determinant table
D. A probability tree

3. For [[a, b], [c, d]], what is the determinant?

col 1	col 2
a	b
c	d

For a 2 x 2 matrix, the determinant is the product of one diagonal minus the product of the other.

A. ab - cd
B. ad - bc
C. ac - bd
D. a + d - b - c

4. If a 2 x 2 matrix has determinant 0, what is true?

col 1	col 2
2	4
1	2

A zero determinant indicates dependent row structure, which means the matrix is not invertible.

A. It is not invertible.
B. It must be the zero matrix.
C. It must have two equal rows or dependent structure.
D. Its determinant must be positive.

5. What must match for two matrices to be added?

A. They must have the same dimensions.
B. They must have determinant 1.
C. They must be square.
D. They must both represent systems.

6. Which matrix is invertible?

A. [[2, 4], [1, 2]]
B. [[1, 2], [3, 5]]
C. [[0, 0], [1, 1]]
D. [[3, 6], [2, 4]]

7. Which matrix is the 2 x 2 identity matrix?

col 1	col 2
1	0
0	1

Multiplying by the identity leaves a matrix unchanged.

A. [[0, 1], [1, 0]]
B. [[1, 0], [0, 1]]
C. [[1, 1], [1, 1]]
D. [[2, 0], [0, 2]]

8. What is a useful first step when turning a system into an augmented matrix?

x-column	y-column	constant
coefficients of x	coefficients of y	right side

Keep each variable in its own column before appending the constants.

A. Take determinants first.
B. Place coefficients in columns and constants on the right.
C. Graph the lines before writing anything.
D. Multiply the equations together.

9. A student says det([[a, b], [c, d]]) = ab - cd. What is the mistake?

A. They should add the diagonals.
B. They forgot the matrix must be 3 x 3.
C. They used the wrong entry pairs; the determinant is ad - bc.
D. The determinant formula should always be squared.

10. Find det([[2, 1], [5, 3]]). Answer with a number.

11. Find det([[4, 2], [1, 7]]). Answer with a number.

12. Solve x + y = 7 and x - y = 1. Answer with a number.

13. For x + y = 7 and x - y = 1, find y. Answer with a number.

14. For 2x + y = 5 and x - y = 1, the determinant of the coefficient matrix is what? Answer with a number.

15. Solve 2x + y = 5 and x - y = 1 for x. Answer with a number.

16. Solve 2x + y = 5 and x - y = 1 for y. Answer with a number.

17. A 2x2 matrix is invertible if its determinant is not what? Answer with a number.

18. Find det([[3, 0], [2, 5]]). Answer with a number.

19. **Solve x + 2y = 9 and x - y = 0 for x. Answer with a number.**

20. **Solve x + 2y = 9 and x - y = 0 for y. Answer with a number.**

21. **Find det([[1, 0], [0, 1]]). Answer with a number.**

22. **When adding [[2, 3], [1, 4]] and [[5, 1], [0, 2]], what is the top-right entry? Answer with a number.**

23. **Add [[1, 2], [3, 4]] and [[5, 6], [7, 8]]. Answer as a matrix.**

24. **Subtract [[1, 1], [2, 2]] from [[5, 4], [3, 2]]. Answer as a matrix.**

25. **Multiply 3 by [[2, -1], [0, 4]]. Answer as a matrix.**

26. **Compute [[2, 1]] * [[3], [4]]. Answer as a matrix.**

27. **Write the determinant expression for [[a, b], [c, d]]. Answer as an equation.**

col 1	col 2
a	b
c	d

Take the main diagonal product and subtract the off-diagonal product.

28. **Which student correctly adds [[1, 2], [3, 4]] and [[5, 6], [7, 8]]?**

A. Student B: [[5, 12], [21, 32]]
B. Student C: [[1, 2, 5, 6], [3, 4, 7, 8]]
C. Student D: [[6, 8], [10, 32]]
D. Student A: [[6, 8], [10, 12]]

29. **Write the augmented matrix for x + 2y = 5 and 3x - y = 4. Answer as an equation.**

30. **Compute [[1, 2], [0, 1]] * [[3, 1], [4, 2]]. Answer as a matrix.**

31. **Compute [[2, 5], [1, 3]] * [[1, 0], [0, 1]]. Answer as a matrix.**

32. **Write the coefficient matrix for 2x + 3y = 7 and -x + 4y = 5. Answer as an equation.**