LESSON MAKER PRO

Matrix Matchup

Turn systems into one organized equation.

HIGH SCHOOL · HSA-REI.C.8

CCSS.Math.Content.HSA-REI.C.8 "(+) Represent a system of linear equations as a single matrix equation in a vector variable."

NAME _____ DATE _____

BUILD THE MATRIX EQUATION

Put each equation in the same variable order, then place its coefficients in one row of a matrix. Put the variables in a column vector and the constants in a second column vector. Use 0 when a variable is missing from an equation.

WORKED EXAMPLE

Write this system as one matrix equation: 13x - 14y = 15; 16x + 17y = 19.

1. Use the x and y coefficients from the first equation for the first row: [13 -14].
2. Use the x and y coefficients from the second equation for the second row: [16 17].
3. Place [x; y] beside the coefficient matrix and place the constants in a column vector.

Answer: [13 -14; 16 17][x; y] = [15; 19]

PRACTICE 6 problems

1 Write this system as one matrix equation: 2x + y = 6; -x + 3y = 9.

ANSWER _____

2 Write this system as one matrix equation: 6x - 2y = 10; -x + 9y = 12.

ANSWER _____

3 Write this system as one matrix equation: y = 2x + 6; 10x + y = 12.

ANSWER _____

4 Write this system as one matrix equation: 2a - b + c = 9; a + 6b - 2c = 1; -a + 2b + 10c = 12.

ANSWER _____

5 Write this system as one matrix equation: x - y = 2; 6y = 10.

ANSWER _____

6 Write this system as one matrix equation: 3m + 2n = 1; -m + 10n = 6.

ANSWER _____

APPLY IT Show your work

1 At a music festival, a ticket costs x dollars and a snack voucher costs y dollars. Maya buys 2 tickets and 6 vouchers for $18. Jordan buys 10 tickets and 1 voucher for $22. Write a matrix equation for the two purchases.

WORK SPACE

ANSWER _____

2 An esports club rents gaming PCs for x dollars each and headsets for y dollars each. For practice, it rents 12 PCs and 2 headsets for $68. For a tournament, it rents 6 PCs and 10 headsets for $62. Write a matrix equation for the rental costs.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Write this system as one matrix equation. Then explain why the coefficient matrix has 3 columns: $x + 2y - z = 6$; $-2x + 6y + z = 12$; $10x - y + 2z = 18$.

_____

_____

ANSWER KEY

Matrix Matchup

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write this system as one matrix equation: 2x + y = 6; -x + 3y = 9.	**[2 1; -1 3][x; y] = [6; 9]**
2	Write this system as one matrix equation: 6x - 2y = 10; -x + 9y = 12.	**[6 -2; -1 9][x; y] = [10; 12]**
3	Write this system as one matrix equation: y = 2x + 6; 10x + y = 12.	**[-2 1; 10 1][x; y] = [6; 12]**
4	Write this system as one matrix equation: 2a - b + c = 9; a + 6b - 2c = 1; -a + 2b + 10c = 12.	**[2 -1 1; 1 6 -2; -1 2 10][a; b; c] = [9; 1; 12]**
5	Write this system as one matrix equation: x - y = 2; 6y = 10.	**[1 -1; 0 6][x; y] = [2; 10]**
6	Write this system as one matrix equation: 3m + 2n = 1; -m + 10n = 6.	**[3 2; -1 10][m; n] = [1; 6]**

PART 2 · APPLY IT

1. **[2 6; 10 1][x; y] = [18; 22]** Use x for the ticket cost and y for the voucher cost. Each purchase gives one row of coefficients, and the total cost goes in the constants vector.
2. **[12 2; 6 10][x; y] = [68; 62]** Use the number of PCs and headsets as the coefficients in each row. Put the two rental totals in the column vector on the right.

CHALLENGE

[1 2 -1; -2 6 1; 10 -1 2][x; y; z] = [6; 12; 18]. The coefficient matrix has 3 columns because each row needs one coefficient for x, y, and z.

Accept equivalent matrix equations when the variable order is consistent across the coefficient matrix and variable vector. If a variable is missing from an equation, require a 0 in its matrix position.