LESSON MAKER PRO

Matrix Moves

Combine matrices to answer questions about plans and totals.

HIGH SCHOOL · A2.N.2.2

A2.N.2.2 "Use addition, subtraction, and scalar multiplication of matrices to solve problems."

NAME _____ DATE _____

THE BIG IDEA

You can add or subtract matrices only when they have the same number of rows and columns. Combine entries in matching positions. To multiply a matrix by a number, multiply every entry by that number.

WORKED EXAMPLE

Let A = [[11, 12], [13, 14]] and B = [[21, 22], [23, 24]]. Find 4A + B.

1. Multiply every entry of A by 4: 4A = [[44, 48], [52, 56]].
2. Add the entries in matching positions: 4A + B = [[44 + 21, 48 + 22], [52 + 23, 56 + 24]].
3. Simplify each entry: [[65, 70], [75, 80]].

Answer: [[65, 70], [75, 80]]

PRACTICE 6 problems

1 Find [[1, 2], [3, 0]] + [[6, -1], [2, 5]].

ANSWER _____

2 Find [[8, 1], [-2, 6]] - [[3, 6], [1, -1]].

ANSWER _____

3 Find 2[[1, -3], [0, 5]].

ANSWER _____

4 Find -3[[2, 0], [-1, 3]].

ANSWER _____

5 Find 2[[1, 3], [-2, 0]] + [[5, -1], [3, 6]].

ANSWER _____

6 Find X if X + [[2, 1], [3, -1]] = [[8, 6], [0, 5]].

ANSWER _____

APPLY IT Show your work

1 At a school concert, two booths sell T-shirts and stickers. In each matrix, the first row shows T-shirts, the second row shows stickers, and the columns show Friday and Saturday. Booth A sells A = [[6, 8], [3, 7]], and booth B sells B = [[2, 1], [5, 1]]. Find A + B. How many T-shirts do the booths sell on Saturday in all?

WORK SPACE

ANSWER _____

2 A gaming club plans the same prize schedule for two weekends. Matrix P = [[5, 6], [3, 2]] shows the prize packs needed for one weekend, and Q = [[2, 3], [1, 1]] shows packs already set aside for the two weekends. Rows show team and solo prizes; columns show Friday and Saturday. Find 2P - Q, the packs the club still needs.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Let A = [[2, 1], [3, 0]] and B = [[-1, 2], [0, 5]]. Find X if 3A - 2B = X + A. Show how you know.

WORK SPACE AND ANSWER

ANSWER KEY

Matrix Moves

HIGH SCHOOL · A2.N.2.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find [[1, 2], [3, 0]] + [[6, -1], [2, 5]].	**[[7, 1], [5, 5]]**
2	Find [[8, 1], [-2, 6]] - [[3, 6], [1, -1]].	**[[5, -5], [-3, 7]]**
3	Find 2[[1, -3], [0, 5]].	**[[2, -6], [0, 10]]**
4	Find -3[[2, 0], [-1, 3]].	**[[-6, 0], [3, -9]]**
5	Find 2[[1, 3], [-2, 0]] + [[5, -1], [3, 6]].	**[[7, 5], [-1, 6]]**
6	Find X if X + [[2, 1], [3, -1]] = [[8, 6], [0, 5]].	**X = [[6, 5], [-3, 6]]**

PART 2 · APPLY IT

1. **A + B = [[8, 9], [8, 8]]; 9 T-shirts on Saturday.** Add entries in matching positions to combine the booths' sales. The first-row, second-column entry gives Saturday's T-shirt total.
2. **2P - Q = [[8, 9], [5, 3]] prize packs.** Double P to get [[10, 12], [6, 4]], then subtract Q entry by entry.

CHALLENGE

X = 2A - 2B = [[6, -2], [6, -10]]. Subtracting A from both sides gives X = 2A - 2B; substituting this matrix makes both sides equal.

Accept equivalent matrix notation if entries remain in the correct positions. For the challenge, accept either the subtraction argument or an entry-by-entry check.