LESSON MAKER PRO

Vector Connections

Multiply matching components, then add.

HIGH SCHOOL · N.VM.B.5.c

N.VM.B.5.c "Determine the dot product of two vectors."

NAME _____ DATE _____

THE DOT PRODUCT

To find the dot product, multiply the components in matching positions, then add the products. The result is one number, not a vector.

WORKED EXAMPLE

Find (11, -12) · (15, -16).

1. Multiply matching components: 11(15) and (-12)(-16).
2. Add the products: 165 + 192 = 357.

Answer: 357

PRACTICE 6 problems

1 Find (1, 6) · (7, -2).

ANSWER _____

2 Find (-4, 3) · (5, 2).

ANSWER _____

3 Find (0, -7) · (8, 1).

ANSWER _____

4 Find (2, -1, 3) · (4, 5, -2).

ANSWER _____

5 Find (-3, 4, 2) · (1, -2, 6).

ANSWER _____

6 Find (1/2, -3) · (6, 1).

ANSWER _____

APPLY IT Show your work

1 You push a scooter with a force vector of (20, 6) newtons. It moves along a displacement vector of (4, 1) meters. Work, in joules, is the dot product of force and displacement. How much work do you do?

WORK SPACE

ANSWER _____

2 A music app gives your preferences the vector (2, -1, 4) and a song the vector (3, 5, -2). The app defines the song's match score as the dot product of these vectors. What is the match score?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Find x so that (x, 3, -2) · (4, -1, 5) = 0. Show the equation you use.

WORK SPACE AND ANSWER

ANSWER KEY # Vector Connections

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find (1, 6) · (7, -2).	**-5**
2	Find (-4, 3) · (5, 2).	**-14**
3	Find (0, -7) · (8, 1).	**-7**
4	Find (2, -1, 3) · (4, 5, -2).	**-3**
5	Find (-3, 4, 2) · (1, -2, 6).	**1**
6	Find (1/2, -3) · (6, 1).	**0**

PART 2 · APPLY IT

1. **86 joules** Compute 20(4) + 6(1) = 86.
2. **-7** Compute 2(3) + (-1)(5) + 4(-2) = 6 - 5 - 8 = -7.

CHALLENGE

4x - 3 - 10 = 0, so x = 13/4.

Accept equivalent equations for the challenge, such as 4x - 13 = 0. In the word problems, require units for work but not for the app's match score.