

Vector Move Lab

Combine directions with vector operations.

HIGH SCHOOL • MA.912.NSO.3

MA.912.NSO.3 "Represent and perform operations with vectors."

NAME _____

DATE _____

COMPONENT BY COMPONENT

Add or subtract vectors by working with the x-components together and the y-components together. To multiply a vector by a scalar, multiply both components by that scalar.

WORKED EXAMPLE

Find $u + v$ if $u = \langle 14, -15 \rangle$ and $v = \langle 6, 36 \rangle$.

1. $u + v = \langle 14 + 6, -15 + 36 \rangle$

2. $u + v = \langle 20, 21 \rangle$

Answer: $\langle 20, 21 \rangle$

PRACTICE 6 problems

1 Find $\langle 3, -5 \rangle + \langle -7, 2 \rangle$.

ANSWER _____

2 Find $\langle 5, 8 \rangle - \langle -2, 1 \rangle$.

ANSWER _____

3 Find $-4\langle 2, -3 \rangle$.

ANSWER _____

4 Find $\langle 7, 3 \rangle + 2\langle -1, 5 \rangle$.

ANSWER _____

5 Point A is $(-3, 5)$ and point B is $(4, -2)$. Find the vector from A to B.

ANSWER _____

6 Solve for x : $5\langle x, -2 \rangle = \langle 10, -10 \rangle$.

ANSWER _____

APPLY IT Show your work

- 1** In a video game, a character moves by vector $\langle 8, -2 \rangle$ and then by vector $\langle -3, 5 \rangle$. What is the character's total movement vector?

WORK SPACE

ANSWER _____

- 2** A robotics team needs its robot to reach location $\langle 8, 5 \rangle$. The robot is currently at location $\langle 3, -2 \rangle$. What movement vector should the team program next?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Let $a = \langle 4, -2 \rangle$ and $b = \langle -3, 5 \rangle$. Find $2a + b$. Explain in one sentence why you multiply a before adding b .

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find $\langle 3, -5 \rangle + \langle -7, 2 \rangle$.	$\langle -4, -3 \rangle$
2	Find $\langle 5, 8 \rangle - \langle -2, 1 \rangle$.	$\langle 7, 7 \rangle$
3	Find $-4\langle 2, -3 \rangle$.	$\langle -8, 12 \rangle$
4	Find $\langle 7, 3 \rangle + 2\langle -1, 5 \rangle$.	$\langle 5, 13 \rangle$
5	Point A is $(-3, 5)$ and point B is $(4, -2)$. Find the vector from A to B.	$\langle 7, -7 \rangle$
6	Solve for x: $5\langle x, -2 \rangle = \langle 10, -10 \rangle$.	$x = 2$

PART 2 • APPLY IT

1. $\langle 5, 3 \rangle$ Add corresponding components: $8 + (-3) = 5$ and $-2 + 5 = 3$.
2. $\langle 5, 7 \rangle$ Subtract the current location from the target location: $\langle 8, 5 \rangle - \langle 3, -2 \rangle = \langle 5, 7 \rangle$.

CHALLENGE

$\langle 5, 1 \rangle$. The scalar 2 multiplies both components of a before b is added.

Accept ordered-pair notation, such as $(5, 3)$, in place of angle-bracket notation when the student clearly means a vector. For the challenge, accept equivalent one-sentence explanations that state the scalar multiplies both components before vector addition.