

Vector Stretch Lab

Scale every component with the same factor.

HIGH SCHOOL • HSN-VM.B.5

CCSS.Math.Content.HSN-VM.B.5 "(+) Multiply a vector by a scalar."

NAME _____

DATE _____

SCALE BOTH COMPONENTS

To multiply a vector by a scalar, multiply each component of the vector by that scalar. Keep the components in the same order, and pay close attention to the signs.

WORKED EXAMPLE

Find $4\langle 11, -13 \rangle$.

1. Multiply the first component: $4 \times 11 = 44$.
2. Multiply the second component: $4 \times -13 = -52$.
3. Write the new vector: $\langle 44, -52 \rangle$.

Answer: $\langle 44, -52 \rangle$

PRACTICE 6 problems

1 Find $3\langle 6, -8 \rangle$.

ANSWER _____

2 Find $-1\langle -9, 16 \rangle$.

ANSWER _____

3 Find $\frac{1}{3}\langle 15, -21 \rangle$.

ANSWER _____

4 Find $\frac{2}{3}\langle 21, -30 \rangle$.

ANSWER _____

5 Find $-2\langle -18, 0 \rangle$.

ANSWER _____

6 Let $u = \langle 3, -9 \rangle$. Find $-6u$.

ANSWER _____

APPLY IT Show your work

- 1** In a video game, a player's move in one round is represented by the vector $\langle -5, 12 \rangle$ squares. The player makes the same move for 6 rounds. What vector represents the total movement?

WORK SPACE

ANSWER _____

- 2** On a coordinate-plane stage map, a dancer moves $\langle 14, -3 \rangle$ feet during one transition. The dancer practices that same transition 8 times. What vector represents the total movement during those transitions?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Find k if $k\langle -6, 15 \rangle = \langle 42, -105 \rangle$. Explain how both components support your value of k .

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find $3\langle 6, -8 \rangle$.	$\langle 18, -24 \rangle$
2	Find $-1\langle -9, 16 \rangle$.	$\langle 9, -16 \rangle$
3	Find $\frac{1}{3}\langle 15, -21 \rangle$.	$\langle 5, -7 \rangle$
4	Find $\frac{2}{3}\langle 21, -30 \rangle$.	$\langle 14, -20 \rangle$
5	Find $-2\langle -18, 0 \rangle$.	$\langle 36, 0 \rangle$
6	Let $u = \langle 3, -9 \rangle$. Find $-6u$.	$\langle -18, 54 \rangle$

PART 2 • APPLY IT

1. **$\langle -30, 72 \rangle$** Multiply each component of $\langle -5, 12 \rangle$ by 6. The total movement vector is $\langle -30, 72 \rangle$.
2. **$\langle 112, -24 \rangle$** Multiply each component of $\langle 14, -3 \rangle$ by 8. The total movement vector is $\langle 112, -24 \rangle$.

CHALLENGE

$k = -7$, because $-7 \times -6 = 42$ and $-7 \times 15 = -105$.

Accept angle-bracket notation or equivalent column-vector notation. Require students to multiply both components by the scalar and preserve signs correctly.