LESSON MAKER PRO

Vector Moves

Use components to model direction and distance.

HIGH SCHOOL · HSN-VM.A

CCSS.Math.Content.HSN-VM.A "Represent and model with vector quantities."

NAME _____ DATE _____

COMPONENT RULES

A vector describes a quantity with both magnitude and direction. Write a vector as <horizontal component, vertical component>. Add or subtract matching components, and multiply each component by a scalar.

WORKED EXAMPLE

Find 2<11,-13>.

1. Multiply each component by 2.
2. 2<11,-13> = <2(11), 2(-13)>.
3. = <22,-26>.

Answer: <22,-26>

PRACTICE 6 problems

1 Write the vector from A(-1,4) to B(7,9).

ANSWER _____

2 Find <3,-6> + <-4,10>.

ANSWER _____

3 Find <9,5> - <1,-7>.

ANSWER _____

4 Find -3<4,-5>.

ANSWER _____

5 Find the magnitude of <9,12>.

ANSWER _____

6 A vector has components <0,-7>. State its magnitude and direction.

ANSWER _____

APPLY IT Show your work

1 In a video game's map editor, a player moves an object 12 squares east and 18 squares north. Then the player moves it 4 squares west and 3 squares south. Let east be positive x and north be positive y. Write the net displacement vector and its magnitude.

WORK SPACE

ANSWER _____

2 A school media club sets a camera slider to move <6,-9> feet for each time-lapse shot. It makes the same move 3 times. Write the total displacement vector.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A delivery robot has a net displacement of <16,20>. Its first move is <9,-4>. Find its second move and explain why your vector is correct.

WORK SPACE AND ANSWER

Vector Moves

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write the vector from A(-1,4) to B(7,9).	**<8,5>**
2	Find <3,-6> + <-4,10>.	**<-1,4>**
3	Find <9,5> - <1,-7>.	**<8,12>**
4	Find -3<4,-5>.	**<-12,15>**
5	Find the magnitude of <9,12>.	**15**
6	A vector has components <0,-7>. State its magnitude and direction.	**Magnitude 7, downward**

PART 2 · APPLY IT

1. **<8,15>; magnitude 17** Combine the horizontal changes and the vertical changes to get <8,15>. Its magnitude is sqrt(8^2 + 15^2) = 17.
2. **<18,-27>** Multiply each component of <6,-9> by 3.

CHALLENGE

The second move is <7,24> because <9,-4> + <7,24> = <16,20>.

Accept equivalent component notation, such as (8,5), when the order of horizontal and vertical components is clear. For direction, accept down, south, or negative y-direction where appropriate.