Scalar Multiples and Vector Directions

Today's Standard

HSN.VM.B5b - Compute the magnitude of a scalar multiple cv using $||cv|| = |c|v$. Compute the direction of cv knowing that when $|c|v \neq 0$, the direction of cv is either along v (for c > 0) or against v (for c < 0).

Real-World Applications for this Standard

Physics: Calculating force direction and magnitude in mechanics.; Engineering: Determining stress vectors in materials.; Computer Graphics: Scaling and transforming objects.; Robotics: Programming movement vectors for robotic arms.; Economics: Modeling growth rates and direction in economic forecasts.

Today I Learned

Today we learned about how multiplying a vector by a number changes its size and direction. If the number is positive, the vector points in the same direction. If the number is negative, it points the other way.

Common Stumbling Blocks

Sometimes, students think the size of the vector is just multiplied by the number without considering if the number is positive or negative. Another mistake is thinking the vector always points the same way, even if the number is negative.

Quiz Me

- What happens to a vector when you multiply it by 2?

- If you multiply a vector by -1, which way does it point?

- What do you need to consider when finding the size of the new vector?

- Can a vector change direction when multiplied by a number?

- What is a real-world example where we use vectors?

Help Me

When we multiply a vector by a number, we can change its size and the way it points. For example, in sports, if you throw a ball harder, you are changing its speed and direction, which is like changing a vector.