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ALGEBRA APPLICATIONS

VECTORS

CONCEPT Vectors are a mathematical tool that allow us to perform computations while considering multiple dimensions. In common terms, a vector is a quantity which has both magnitude and direction, as opposed to just magnitude (like an integer).

REAL WORLD CONNECTIONS

Vectors have a wide application in the sciences, physics especially. Think of any road you drive on to get to a destination. Even though Google/Apple maps will give you an overall distance (the magnitude) to your destination, in order to get there, you will have to take roads that are on a grid pattern (think axes), especially if you live in the middle of the city or in a rural area. In order to calculate your final distance, you have to consider movement in all 4 cardinal directions, not just the straight line distance. Calculating this is why your destination might be relatively close, but take a lot longer to arrive at.

APPLICATION

Take two billiard balls and roll them into a collision. Note how their final velocities and directions depend upon their initial conditions. Keep one ball at the same velocity and direction, and increase the velocity on the second one. The final direction and velocity of both should be biased towards the second ball. If you have different sizes, try different sizes and note how that impacts the final velocity of each. Mathematically, this is vector addition. Note that this is analogous to two cars which collide in an accident. The final states are dependent upon the mass and velocity of each vehicle, but you can simulate it with this activity with billiard balls. Vectors are invaluable for analyzing and recreating vehicle accidents and crime scenes.

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