

MCV4U

CALCULUS & VECTORS

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1 Vectors

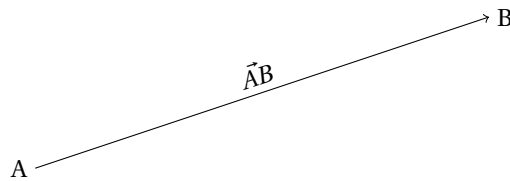
Vectors are mathematical entities that extend our understanding beyond the one-dimensional quantities.

Unlike scalar values that only have magnitude, vectors incorporate both magnitude and direction, offering a versatile toolkit for describing dynamic systems. Below are some examples of vectors and scalar quantities.

- **Scalar Quantities:** Mass, Temperature, Time, Distance, Speed, Energy, Work, Power, Pressure, Volume, Density
- **Vector Quantities:** Displacement, Velocity, Acceleration, Force, Momentum, Weight

When written in mathematical equations, vectors are usually represented via a symbol with a vector indicator (i.e. \vec{v}) or via a jointure of the two points (i.e. \vec{AB} is a vector from point A to point B). Vectors can also be represented in many other ways, but the most common ways are: algebraically, numerically, and geometrically. Below are examples of each:

- **Algebraically:** $\vec{a} = \langle x, y \rangle$
- **Numerically:** $\vec{a} = [a, b, c]$ (Can also be written as a column matrix)
- **Geometrically:**



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