Vocabulary: Vectors

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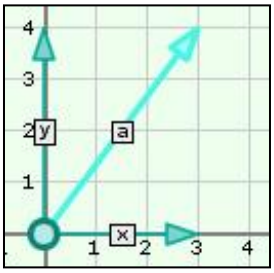

- Component – the projection of a *vector* in a given direction.
  - On a coordinate grid, a vector can be described by an *x* component and a *y* component.
  - For example, the vector 3**i** + 4**j** has an *x* component of +3 and a *y* component of +4.
- Dot product – for vectors, the result of multiplying corresponding components and adding those products.
  - For example, the dot product of (3**i** + 4**j**) and (5**i** + 2**j**) is 15 + 8 = 23
  - Dot products are *scalar* quantities, not vectors.
  - Dot products are used for various purposes in geometry, trigonometry, calculus, and physics.
    - For example, dot products are used to calculate how much mechanical work is done. Work, a scalar quantity, is equal to the dot product of force and displacement, both vector quantities (W = **F** • **d**).
- Magnitude – the size, brightness, or intensity of an object or event.
  - The magnitude of a vector is its length.
  - The magnitude of a vector is written: ||**x**||.
- Resultant – a vector representing the sum of two or more vectors.
- Scalar – a quantity that has magnitude, but no direction.
  - Examples of scalars include speed, temperature, and volume.
- Unit vector notation – a method of writing the components that make up a vector.
  - In unit vector notation, the **i** component represents displacement along the *x*-axis of a coordinate grid and the **j** component represents displacement along the *y*-axis.
  - For example, if a vector has an *x* component of +3 and a *y* component of +4, its unit vector notation would be 3**i** + 4**j**.
- Vector – a representation that specifies the direction and magnitude of a quantity.
  - In physics, vectors are used to represent displacement, velocity, acceleration, force, and other quantities that have a specific direction.
  - Vectors are represented visually by arrows.
  - Vectors in equations are represented by bold letters such as **d** (displacement) and **F** (force).