

Lesson 1.3 - Graphical Vectors

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Physics 12

Harris 2026

Lesson 1.3: Graphical Vectors

Unit 1: Kinematics, Vectors, and Mathematics

Vectors	Scalars
Magnitude/Size $\rightarrow 4\text{kg}$ Direction $\rightarrow 32^\circ \text{ W of N}$ ex. velocity, acceleration, displacement, force, momentum.	Magnitude/Size only $\rightarrow 9\text{m}$ ex. speed, time, mass, distance, energy, work, power

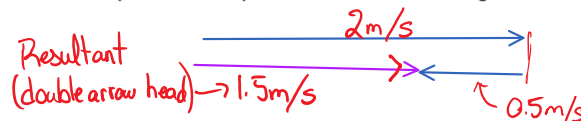
Vectors can be represented by arrows. The length of the arrow is proportional to the vector's magnitude and where it points indicates its direction based on your chosen coordinate system.

Example:

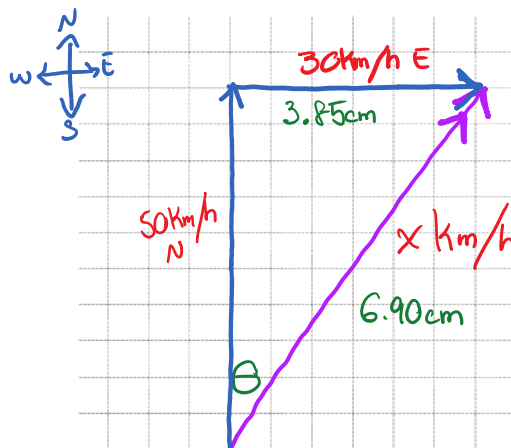
$$\frac{1\text{cm}}{(4\text{cm})} = \frac{1\text{m/s}}{4\text{m/s}} \quad \frac{(8\text{cm})}{8\text{m/s}}$$

Vector Addition: graphically, we use the Tip-to-tail method.

Example in 1D: Mr. Molcak walks 2.0 m/s when there is no wind. If a 0.50 m/s wind blows in his face, slowing him down by that wind speed. How fast does he go?



Example in 2D: Determine the resultant velocity when combining 50 km/h North and 30 km/h East .

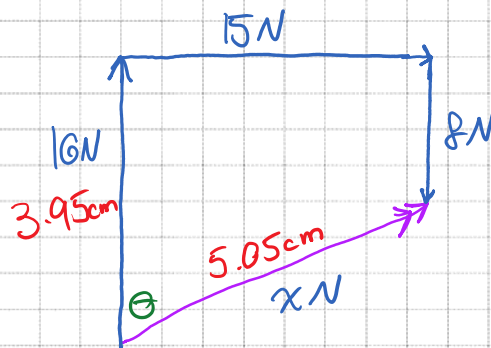


Proportions $\left(\frac{D}{A} = \frac{D}{A} \right)$

$$\frac{3.85\text{cm}}{30\text{km/h}} = \frac{6.90\text{cm}}{x}$$

$$x = 54\text{ km/h at } 34^\circ \text{ E of N}$$

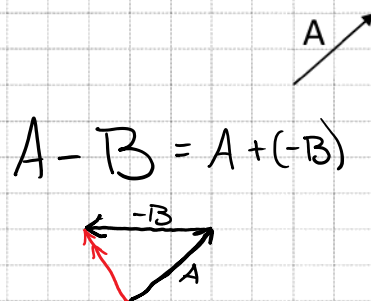
Example: Add 16 N North, 15 N East, and 8 N South



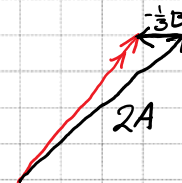
$$\frac{3.95\text{cm}}{16\text{N}} = \frac{5.05\text{cm}}{x\text{N}}$$

$$x = 20\text{N at } 64^\circ \text{ E of N}$$

Vector Subtraction: adding the opposite.



$$2A - \frac{1}{3}B = 2A + \left(-\frac{1}{3}B\right)$$



Assignment: WS 1.3 – Vector Addition and Subtraction