

Graphical Method of Vector Addition

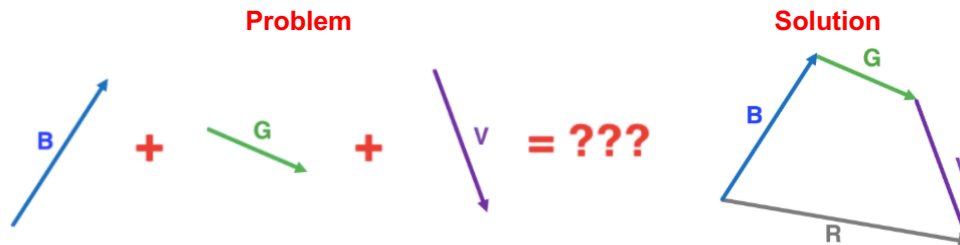
Lesson Notes

What is Vector Addition?

The process of combining two or more vectors to determine the cumulative effect.

Head-to-Tail Method

When adding vectors, place the tail of the second vector at the head of the first vector. The tail of the third vector is placed at the head of the second vector. The **resultant** vector is drawn from the tail of the first vector to the head of the last vector.



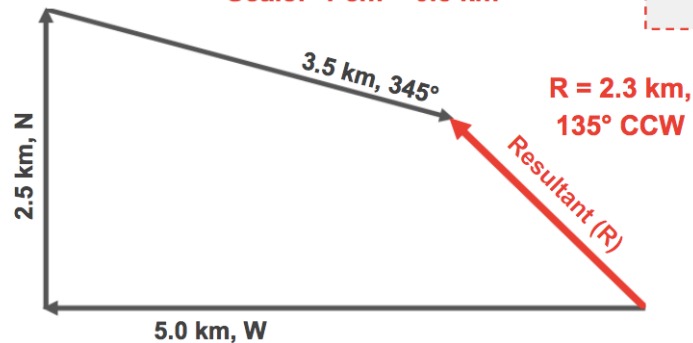
Scaled Vector Addition Diagrams

Example Problem

Add **A** + **B** + **C**

A: 5.0 km, West **B**: 2.5 km, North **C**: 3.5 km, 345°

Scale: 1 cm = 0.5 km



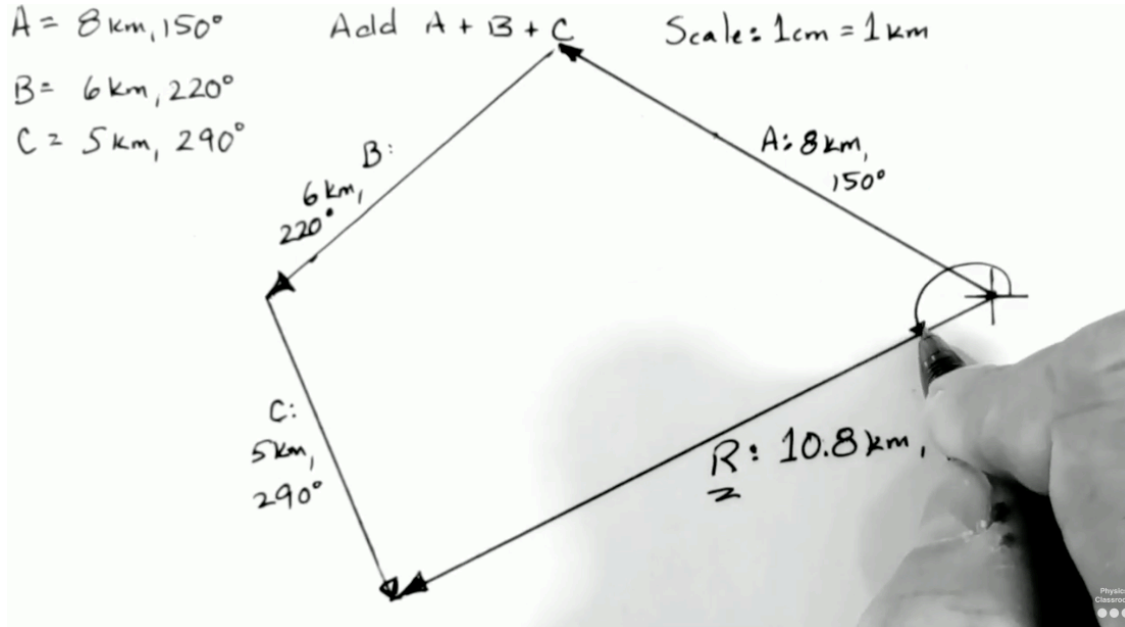
Scale

The ratio between the distance on paper and the real-life magnitude of a vector.

Procedure for Graphical Method of Vector Addition

1. Decide on an appropriate scale. Record it on the diagram.
2. Pick a starting point.
3. Draw first vector with appropriate length and in the indicated direction.
4. Draw the second and remaining vectors with appropriate length and direction, beginning at the arrowhead of the previous vector.
5. Draw the resultant from the tail of the first to the head of the last.
6. Measure the length of the resultant; use the scale to convert to the magnitude of the resultant.
7. Use a protractor to measure the vector's direction. Use the accepted convention to express this (e.g., the CCW from East).

Finished Example



Common Pitfalls to the Graphical Method

1. Choosing an inappropriate scale.
2. Not drawing the resultant (**R**) after adding the vectors.
3. Not reporting the magnitude and direction of **R**.
4. Drawing the wrong resultant.
5. Not adding the vectors head to tail.
6. Not labeling the vectors or the resultant.
7. Selecting a bad starting point.

Practice makes perfect!!

“Good judgement comes from experience. And unfortunately a whole lot of that comes from bad judgement.” -- Will Rogers