# Model magnitude-and-direction situations using vectors

## Key skills | Free preview

Learning target: Model magnitude-and-direction situations using vectors.

Add velocities only when they are expressed in compatible coordinates and reference frames. Relative velocity subtracts the observer’s velocity. Forces add as vectors; equilibrium requires zero resultant. Constant resultant force gives constant acceleration when mass is fixed, which can then be integrated to obtain motion.

## Try the mathematics

Task 1. A boat moves at (4,0) m/s relative to water, and the water moves at (0,3) m/s relative to shore. Find ground velocity and speed. An observer moves at (1,1) m/s; find the boat’s velocity relative to that observer.

## Continue with the full worksheet

The complete resource has 2 focused task sets and substantive worked solutions. Use an exercise book or print the A4 worksheet. This preview shows the first task without its full solution.

Find this resource: https://resources.aspiretopowerlearning.com.au/vce/skills/sm-u2-o1-ks-08/

## Study-design reference

VCE Mathematics Study Design 2023-2027, version 1.1 (November 2022). Specialist Mathematics; Unit 2; Outcome 1; Key skills; bullet 8; p. 69.

The learning target is a concise paraphrase. Aspire reference: sm-u2-o1-ks-08. This is an internal identifier, not an official VCAA code.

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