Use vectors in position, displacement, velocity and force problems

Key skills | Free preview

Learning target: Use vectors in position, displacement, velocity and force problems.

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-10/

Study-design reference

VCE Mathematics Study Design 2023-2027, version 1.1 (November 2022). Specialist Mathematics; Unit 2; Outcome 1; Key skills; bullet 10; p. 70.

The learning target is a concise paraphrase. Aspire reference: sm-u2-o1-ks-10. This is an internal identifier, not an official VCAA code.

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