# From average rates to tangent gradients

## Key skills | Free preview

Learning target: Calculate or estimate secant and tangent gradients using algebraic, numerical and graphical information.

An average rate is change in output divided by change in input over an interval. An instantaneous rate describes the limiting tangent gradient as that interval shrinks. Units come from the output divided by the input. A positive rate can still be getting smaller, so distinguish the sign of change from its size.

## Try the mathematics

Task 1. A position is $s(t)=t^2+3t$ metres. Find its average velocity on $[1,3]$. Find the average velocity on $[2,2+h]$, then use shrinking $h$ to determine the instantaneous velocity at $t=2$.

## 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/aspire-mm-u1-o1-ks-15/

## Study-design reference

VCE Mathematics Study Design 2023-2027, version 1.1 (November 2022). Mathematical Methods; Unit 1; Outcome 1; Key skills; bullet 15; p. 47.

The learning target is a concise paraphrase. Aspire reference: aspire-mm-u1-o1-ks-15. This is an internal identifier, not an official VCAA code.

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