Curve analysis and a constrained optimum

Key skills | Free preview

Learning target: Differentiate elementary, transformed and combined functions, then use the derivatives in graph analysis and optimisation.

Optimisation starts with a valid domain and ends with a comparison of feasible candidates. A stationary value outside that domain cannot solve the problem. Derivative signs classify interior candidates, while endpoints or limits may determine the global result. Curve sketching benefits from the same analysis, including inflection points and distant behaviour.

Try the mathematics

Task 1. For $f(x)=xe^{(-x)}$, $x\geq 0$, find the stationary point and its type, the inflection point, and the limiting value as $x\to\infty$. Sketch the curve.

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-u34-o1-ks-09/

Study-design reference

VCE Mathematics Study Design 2023-2027, version 1.1 (November 2022). Mathematical Methods; Units 3–4; Outcome 1; Key skills; bullet 9; p. 102.

The learning target is a concise paraphrase. Aspire reference: aspire-mm-u34-o1-ks-09. This is an internal identifier, not an official VCAA code.

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