



Australian Government

Assessment Requirements for MEM234022

Apply advanced calculus to technology problems

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM234022A Apply advanced calculus to technology problems.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include:

- identifying and defining problems
- identifying appropriate calculus technique for engineering or related problems
- applying the appropriate technique to the problem and solving and confirming answer using the technique on at least two occasions
- communicating the outcome of the analysis in a manner suited to the stakeholder/s and confirming the outcome has addressed the problem.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- differential calculus including:
- standard derivatives and rules:
 - power rule
 - product rule
 - quotient rule
 - chain or function of a function rule
 - standard derivatives for common functions
- higher order derivatives
- graph sketching
- maxima and minima (optimisation)
- rates of change
- small increments (errors and approximations)
- implicit differentiation
- logarithmic differentiation
- partial differentiation
- directional derivatives

- integral calculus including:
 - integration techniques (areas and volumes)
 - partial fractions
 - integration by parts
 - trigonometric and hyperbolic substitution methods
 - improper integrals
 - integration of partial derivatives
 - evaluation of arc lengths
 - evaluation of surface areas
 - mean and root mean square (RMS) values
 - approximate integration (the trapezoidal and Simpson's rules)
 - evaluation of centre of mass
 - evaluation of centroidal positions in plane regions
 - evaluation of moments of inertia and second moments of area
 - evaluation of work and energy
 - evaluation of centres of pressure on submerged plates.
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Assessment Conditions

- Assessors must:
 - have vocational competency in applying advanced calculus to technology problems at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015 or its replacement* and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
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Links

Companion Volume Implementation Guides are available on VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

