Australian Government

MEM30012 Apply mathematical techniques in a manufacturing engineering or related environment

Release: 1

MEM30012 Apply mathematical techniques in a manufacturing engineering or related environment

Modification History

Release 1. Supersedes and is equivalent to MEM30012A Apply mathematical techniques in a manufacturing engineering or related environment.

Application

This unit of competency defines the skills and knowledge required to apply the concepts of mathematics to engineering situations within the individual's area of engineering expertise. It applies to technician level work that requires basic algebraic, trigonometric and statistical knowledge and skill Including arithmetic, algebraic expressions with one independent variable, two-dimensional geometry, trigonometry, linear functions, basic quadratic functions and basic statistical methods.

The unit applies to engineering or related activities and is suitable for people giving support in manufacturing or engineering operations and those pursuing qualifications and careers at advanced trade, paraprofessional or technician level. All work is carried out under supervision.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Band: B

Unit Weight: 4

Pre-requisite Unit

Nil

Competency Field

Engineering technician

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Use concepts of arithmetic in the solution of engineering problems	1.1 Follow standard operating procedures and comply with work health and safety (WHS) requirements at all times 1.2 Convert units of physical quantities to facilitate engineering

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	calculations 1.3 Perform calculations to solve problems involving rational and irrational numbers 1.4 Use scientific notation to represent numbers 1.5. Solve engineering problems involving algebraic expressions with one independent variable using mathematical operations in their correct order 1.6 Check calculations for reasonableness using estimating and approximating techniques
2. Use two-dimensional geometry to solve practical problems	2.1 Convert angles expressed in degrees to radians and vice versa 2.2 Calculate the perimeter, area, length and angles of two-dimensional figures 2.3 Calculate the volume and surface area of complex figures 2.4 Convert points identified in terms of cartesian co-ordinates to polar co-ordinates and vice versa
3. Use trigonometry to solve practical problems	3.1 Calculate the lengths of the sides of right-angled triangles using basic trigonometry functions 3.2 Determine angles in a right-angled triangle given the lengths of two sides using inverse trigonometry functions 3.3 Determine the lengths of the sides of acute and obtuse angled triangles given one side and two angles using the sine rule 3.4 Determine the lengths of the sides of acute and obtuse angled triangles given two sides and one angle using the cosine rule
4. Graph linear functions	4.1 Solve linear functions graphically and determine equations of straight lines from the slope and one point or two points 4.2 Solve two linear functions simultaneously, both algebraically and geometrically 4.3 Determine the length and midpoint of a line segment
5. Solve linear and quadratic equations	5.1 Solve quadratic equations 5.2 Solve simultaneous linear and quadratic equations
6. Perform basic statistical calculations	6.1 Calculate mean, median and mode from given data 6.2 Calculate and interpret standard deviation, employing graphical

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	representation

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.	
Trigonometric function identities include:	• reciprocal • Pythagorean • quotient • co-function • odd-even.
Correct order refers to the correct procedure when:	• expanding brackets • factorising algebraic expressions • factorising quadratic expressions • simplifying algebraic fractions • transposing formulae • solving simple one variable equations • finding the quotient and remainder given a linear division.
Complex figures include the following singularly or in combination:	• polygons • complex shapes • cones • pyramids • spheres • frustums and intersections of figures.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM30012A Apply mathematical techniques in a manufacturing engineering or related environment.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2