Title	Use advanced mathematics to solve problems in an extractive industries workplace		
Level	5	Credits	15

Purpose	People credited with this unit standard are able to: solve advanced mensuration and trigonometry problems; use advanced algebra to solve workplace problems; solve pumping and other complex workplace problems requiring the use of performance curves; use vectors and vector mathematics and statistics to solve complex workplace problems, in an extractive industries workplace.

Classification	Extractive Industries > Extractive Industries Management

Available grade	Achieved

Guidance Information

None.

Outcomes and performance criteria

Outcome 1

Solve advanced mensuration problems in an extractive industries workplace.

Performance criteria

1.1 The areas and volumes of shapes found in the workplace are calculated using a variety of methods.

  Range   breaking into simpler shapes, graphical method – counting squares, Simpson's Rule, Trapezium Rule, planimetry and contour maps.

Outcome 2

Solve advanced trigonometry problems in an extractive industries workplace.

Performance criteria

2.1 Trigonometrical ratios are used to solve complex problems in the workplace.

  Range   sine, cosine, tangent, gradients.

2.2　　　　Trigonometrical rules are used to solve complex problems involving non-right-angle triangles in the workplace.

　　　　　Range　　　sine rule, cosine rule.

Outcome 3

Use advanced algebra to solve problems in an extractive industries workplace.

Performance criteria

3.1　　　　Simultaneous equations are used to solve complex problems in the workplace.

　　　　　Range　　　all problems based on two equations with two variables (x and y).

3.2　　　　Quadratic equations are used to solve complex problems in the workplace.

　　　　　Range　　　all problems based on equations of the form $ax^2 + bx + c = 0$.

Outcome 4

Solve pumping and other complex workplace problems requiring the use of performance curves in an extractive industries workplace.

Performance criteria

4.1　　　　Pumps, fans, and mobile plant are selected by matching performance data supplied by the manufacturer to demands encountered in the workplace.

4.2　　　　Other variables are derived from the pumps, fans, and mobile plant selected.

　　　　　Range　　　may include but is not limited to – power supply.

Outcome 5

Use vectors and vector mathematics to solve problems in an extractive industries workplace.

Performance criteria

5.1　　　　Problems of motion and force are solved using vectors.

Outcome 6

Use statistics to solve complex problems in an extractive industries workplace.

Performance criteria

6.1　　　　Tabular and graphical representations of data derived from the workplace are produced.

　　　　　Range　　　frequency distribution, cumulative distribution.

6.2　　Mean, median, mode, range, and standard deviation are calculated and used for sampling problems in the workplace.

Range　　problems based on simple Gaussian distributions.

Planned review date	31 December 2022

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	25 November 2000	31 December 2017
Review	2	24 November 2005	31 December 2017
Rollover	3	16 July 2010	31 December 2017
Review	4	18 June 2015	N/A
Rollover	5	25 January 2018	N/A

Consent and Moderation Requirements (CMR) reference	0114

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact MITO New Zealand Incorporated info@mito.org.nz if you wish to suggest changes to the content of this unit standard.