DEMONSTRATE NUMERACY SKILLS

UNIT CODE: TO/OS/TM/BC/02/6

Unit Description

This unit describes the competencies required by a worker in order to apply a wide range of mathematical calculations for work; apply ratios, rates and proportions to solve problems; estimate, measure and calculate measurement for work; use detailed maps to plan travel routes for work; use geometry to draw and construct 2D and 3D shapes for work; collect, organize and interpret statistical data; use routine formula and algebraic expressions for work and use common functions of a scientific calculator.

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Elements and Performance Criteria

ELEMENT These describe the key outcomes which make the workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Apply a wide range of mathematical calculations for work	1.1. Mathematical information embedded in a range of workplace tasks and texts is extracted 1.2. Mathematical information is interpreted and comprehended

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	1.3. A range of mathematical and problem solving processes are selected and used 1.4. Different forms of fractions, decimals and percentages are flexibly used 1.5. Calculation performed with positive and negative numbers 1.6. Numbers are expressed as powers and roots and are used in calculations 1.7. Calculations done using routine formulas 1.8. Estimation and assessment processes are used to check outcome 1.9. Mathematical language is used to discuss and explain the processes, results and implications of the task
2. Use and apply ratios, rates and proportions for work	2.1. Information regarding ratios, rates and proportions is extracted from a range of workplace tasks and texts 2.2. Mathematical information related to ratios, rates and proportions is analysed 2.3. Problem solving processes are used to undertake the task 2.4. Equivalent ratios and rates are simplified 2.5. Quantities are calculated using ratios, rates and proportions 2.6. Graphs, charts or tables are constructed to represent ratios, rates and proportions

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	2.7. The outcomes are reviewed and checked 2.8. Information is recorded using mathematical language and symbols
3. Estimate, measure and calculate measurement for work	3.1. Measurement information embedded in workplace texts and tasks is extracted and interpreted 3.2. Appropriate workplace measuring equipment is identified and selected 3.3. Accurate measurements are estimated and made 3.4. The area of 2D shapes including compound shapes is calculated 3.5. The volume of 3D shapes is calculated using relevant formulas 3.6. Sides of right angled triangles are calculated using Pythagoras' theorem 3.7. Conversions are performed between units of measurement 3.8. Problem solving processes are used to undertake the task 3.9. The measurement outcomes are reviewed and checked 3.10. Information is recorded using mathematical language and symbols appropriate for the task

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4. Use detailed maps to plan travel routes for work	4.1. Different types of maps are identified and interpreted 4.2. Key features of maps are identified 4.3. Scales are identified and interpreted 4.4. Scales are applied to calculate actual distances 4.5. Positions or locations are determined using directional information 4.6. Routes are planned by determining directions and calculating distances, speeds and times 4.7. Information is gathered and identified and relevant factors related to planning a route are checked 4.8. Relevant equipment is selected and checked for accuracy and operational effectiveness 4.9. Task is planned and recorded using specialized mathematical language and symbols appropriate for the task
5. Use geometry to draw 2D shapes and construct 3D shapes for work	5.1. A range of 2D shapes and 3D shapes and their uses in work contexts is identified 5.2. Features of 2D and 3D shapes are named and described 5.3. Types of angles in 2D and 3D shapes are identified

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	5.4. Angles are drawn, estimated and measured using geometric instruments 5.5. Angle properties of 2D shapes are named and identified 5.6. Angle properties are used to evaluate unknown angles in shapes 5.7. Properties of perpendicular and parallel lines are applied to shapes 5.8. Understanding and use of symmetry is demonstrated 5.9. Understanding and use of similarity is demonstrated 5.10. The workplace tasks and mathematical processes required are identified 5.11. 2D shapes are drawn for work 5.12. 3D shapes are constructed for work 5.13. The outcomes are reviewed and checked 5.14. Specialized mathematical language and symbols appropriate for the task are used
6. Collect, organize and interpret statistical data for work	6.1. Workplace issues requiring investigation are identified 6.2. Audience/Population/Sample unit is determined 6.3. Data to be collected is identified 6.4. Data collection method is selected

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	6.5. Appropriate statistical data is collected and organized 6.6. Data is illustrated in appropriate formats 6.7. The effectiveness of different types of graphs is compared 6.8. The summary statistics for collected data is calculated 6.9. The results/findings are interpreted 6.10. Data is checked to ensure that it meets the expected results and content 6.11. Information from the results including tables, graphs and summary statistics is extracted and interpreted 6.12. Mathematical language and symbols are used to report results of investigation
7. Use routine formula and algebraic expressions for work	7.1. Understanding of informal and symbolic notation, representation and conventions of algebraic expressions is demonstrated 7.2. Simple algebraic expressions and equations are developed 7.3. Operate on algebraic expressions 7.4. Algebraic expressions are simplified 7.5. Substitution into simple routine equations is done 7.6. Routine formulas used for work tasks are identified and comprehended

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	7.7. Routine formulas are evaluated by substitution 7.8. Routine formulas are transposed 7.9. Appropriate formulas are identified and used for work related tasks 7.10. Outcomes are checked and result of calculation used
8. Use common functions of a scientific calculator for work	8.1. Required numerical information to perform tasks is located 8.2. The order of operations and function keys necessary to solve mathematical calculation are determined 8.3. Function keys on a scientific calculator are identified and used 8.4. Estimations are referred to check reasonableness of problem solving process 8.5. Appropriate mathematical language, symbols and conventions are used to report results

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Range

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

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Variable	Range May include but is not limited to:
1. Geometry	1.1. Scale drawings 1.2. Triangles 1.3. Simple solids 1.4. Circles 1.5. Squares 1.6. Rectangles 1.7. Spheres 1.8. Cylinders 1.9. Cubes 1.10. Polygons 1.11. Cuboids

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Applying fundamental operations (addition, subtraction, division, multiplication)
- Using calculator
- Using different measuring tools

Required Knowledge

The individual needs to demonstrate knowledge of:

- Types of common shapes

- Differentiation between two dimensional shapes/objects
- Formulae for calculating area and volume
- Types and purpose of measuring instruments
- Units of measurement and abbreviations
- Fundamental operations (addition, subtraction, division, multiplication)
- Rounding techniques
- Types of fractions
- Different types of tables and graphs
- Meaning of graphs, such as increasing, decreasing, and constant value
- Preparation of basic data, tables and graphs

Evidence Guide

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

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1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1. Applied a wide range of mathematical calculations for work 1.2. Used and applied ratios, rates and proportions for work 1.3. Estimated, measured and calculated measurement for work 1.4. Used detailed maps to plan travel routes for work

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	1.5. Used geometry to draw 2D shapes and construct 3D shapes for work 1.6. Collected, organized, and interpreted statistical data for work 1.7. Used routine formula and algebraic expressions for work 1.8. Used common functions of a scientific calculator for work
2. Resource Implications	2.1. Calculator 2.2. Basic measuring instruments
3. Methods of Assessment	Competency may be assessed through: 3.1. Written Test 3.2. Oral Questioning 3.3. Demonstration
4. Context of Assessment	Competency may be assessed in an off-the-job setting
5. Guidance information for Assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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