TASMANIAN
ASSESSMENT, STANDARDS
& CERTIFICATION

Workplace Maths

LEVEL 2	**15** **TCE CREDIT POINTS**
COURSE CODE	MTW215114
COURSE SPAN	2014 — 2018
READING AND WRITING STANDARD	NO
MATHEMATICS STANDARD	YES
COMPUTERS AND INTERNET STANDARD	NO

This course was delivered in 2017. Use A-Z Courses to find the current version (if available).

Workplace Maths focuses on enabling learners to use maths effectively, efficiently and critically to make informed decisions in their daily lives

The emphasis of Workplace Maths is to provide learners with the mathematical knowledge, skills and understanding to solve problems in real contexts for a range of workplace, personal, further learning and community settings. This subject provides the opportunity for learners to prepare for post-school options of employment and further training.

Course Description

This course involves the study of five (5) **compulsory** topics. For each topic, there are suggested examples in context that may be investigated to illustrate the mathematics involved. The order in which these topics is delivered is not prescribed. The topics are:

- calculations, use of algebra, percentages and ratios

- measurement

- tables, graphs, diagrams and data

- money

- time and motion.

Rationale

Maths is the study of order, relation and pattern. From its origins in counting and measuring, it has evolved in highly sophisticated and elegant ways to become the language used to describe much of the physical world. Maths also involves the study of ways of collecting and extracting information from data and of methods of using that information to describe and make predictions about the behaviour of aspects of the real world, in the face of uncertainty. Maths provides a framework for thinking and a means of communication that is powerful, logical, concise and precise. It impacts upon the daily life of people everywhere and helps them to understand the world in which they live and work.

Workplace Maths focuses on enabling learners to use maths effectively, efficiently and critically to make informed decisions in their daily lives. The emphasis of Workplace Maths is to provide learners with the mathematical knowledge, skills and understanding to solve problems in real contexts for a range of workplace, personal, further learning and community settings. This subject provides the opportunity for learners to prepare for post-school options of employment and further training.

Aims

Workplace Maths aims to equip learners with mathematical skills and understanding to apply mathematical calculations to solving real-world problems. This includes using formulas to find unknown quantities, percentages, rates and ratios involving the mathematics of measurement, money, and time and motion. It also incorporates the representation and comparison of data, the interpretation of graphs and the use of appropriate technologies in problem solving.

For all content areas of Workplace Maths the proficiency strands understanding, fluency, problem solving and reasoning from the Australian F-10 curriculum are very much applicable and should be inherent in students' learning of the subject. Each of these is essential and mutually reinforcing. For all content areas, practice allows learners to develop fluency in these skills.

Teachers are encouraged to develop and apply content in contexts that are meaningful and of interest to their learners. By adopting an investigative approach numeric skills are applied to deriving real world solutions. Workplace Maths encourages a variety of approaches that could be used to achieve this purpose.

Learning Outcomes

On successful completion of this course, learners will be able to:

1. understand the concepts and techniques used in mathematical calculations, involving algebraic substitution, percentages, rates and ratios
2. apply reasoning skills to solve practical problems in the mathematics of measurement, money and time and motion
3. communicate their arguments and strategies when solving mathematical problems using appropriate mathematical or statistical language
4. interpret mathematical and statistical information and ascertain the reasonableness of their solutions to problems.

Access

It is recommended that learners attempting this course will have previously achieved at least a Grade 10 'D' in *Australian Curriculum: Mathematics*.

Pathways

The successful completion of Everyday Maths Level 1 may provide a useful pathway to the study of Workplace Maths Level 2.

Course Size And Complexity

This course has a complexity level of 2.

At Level 2, the learner is expected to carry out tasks and activities that involve a range of knowledge and skills, including some basic theoretical and/or technical knowledge and skills. Limited judgement is required, such as making an appropriate selection from a range of given rules, guidelines or procedures. VET competencies at this level are often those characteristic of an AQF Certificate II.

This course has a size value of 15.

Course Content

CALCULATIONS, USE OF ALGEBRA, PERCENTAGES, RATES AND RATIOS

Calculations skills checklist:

- calculate with whole numbers, decimals, fractions and percentages and use these appropriate to context
- use the four basic operations algorithmically (pen and paper) (division with single digit divisor)
- recall and use of basic multiplication table facts
- use mental multiplication and division by 10, 100 and 1000
- apply arithmetic operations according to their correct order
- calculate and interpret averages
- solve practical problems requiring basic number operations
- ascertain the reasonableness of answers to arithmetic calculations
- use leading digit approximation to obtain estimates of calculations
- check results of calculations for accuracy
- use a calculator for multi-step calculations, accurately and appropriately including the use of its memory, as applicable, and understanding of how order of operations applies to calculator technique
- recognise the significance of place value after the decimal point
- recognise and use equivalent fractions, decimals and percentages and the ability to convert from one form to another
- compare and order fractions, decimals and percentages
- understand the relationship between division and fractions and the use of fractions to represent sharing situations (e.g. 3 pizzas, 4 people ... $3 \div 4 = \dfrac{3}{4}$ of a pizza each)
- multiply a whole number by a fraction, decimal or percentage in a problem context
- round up or round down numbers to the nearest 10, 100 or 1000 or the required number of decimal places
- apply approximation strategies for calculations
- use mathematical knowledge to solve problems in a range of contexts.

Examples in context:

- *creating a budget for living at home and for living independently*
- *calculating various costs per day, week, month using tables, spreadsheets, and estimation. For example: food, clothing, transport, utility costs.*
- *creating and evaluating daily menus to meet the minimum daily nutritional and energy needs*
- *recording aspects of maths encountered in VET programs, part-time jobs or over the course of a day.*

Percentages:

- calculate a percentage of a given amount
- determine one amount expressed as a percentage of another.

Examples in context:

- *calculating and comparing monthly and weekly amounts available for accommodation with varying income levels using percentages*
- *using percentages to compare the different components of personal expenditure*
- *expressing ingredients of packaged food as percentages of the total quantity, or per serving size, or per 100 grams*
- *comparing the quantities, both numerically and in percentage terms, of additives within a product or between similar products; for example, flavours.*

Use of Algebra:

- understand the notion of directed numbers
- substitute numerical values into algebraic expressions, to find the value of an unknown.

Examples in context:

- *the use of substitution in formulas related to Measurement, Money and Motion.*

Ratios:

- demonstrate an understanding of the elementary ideas and notation of ratio
- understand the relationship between fractions and ratio
- express a ratio in simplest form
- find the ratio of two quantities
- divide a quantity in a given ratio
- use ratio to describe simple scales.

Examples in context:

- *compare body ratios such as hip height versus stride length, foot length versus height, body mass index*
- *discuss various ratios used in machines. For example: gear ratios, power to weight ratios.*
- *compare ratios such as people per household.*

Rates:

- identify common usage of rates, such as: km/h as a rate to describe speed or beats/minute as a rate describing pulse rate
- convert units of rates occurring in practical situations to solve problems
- use rates to make comparisons.

Examples in context:

- *using rates to compare and evaluate nutritional information. For example, quantity per serve and quantity per 100g.*
- *using unit prices (price per kilogram, per litre, etc...) to determine 'best' buys*
- *using rates to find fuel consumption for different vehicles in different driving conditions*
- *calculating heart rates as beats per minute given the number of beats and different time periods*
- *applying rates to calculate the energy used in various activities over different time periods*
- *completing calculations with rates, including solving problems involving direct proportion in terms of rate. For example: if a person works for 3 weeks at a rate of $300 per week, how much do they earn?*

MEASUREMENT

- use an accurate interpretation of measuring instruments in practical investigations of measurement including:
    - simple and familiar measuring tools, such as a measuring tape, electronic bathroom scales
    - workplace specific measuring tools, such as a tripometer, electronic scales, temperature gauge, pressure gauge
    - precision measurement tools, such as a feeler gauge, micrometer, thermometer.

Linear measure:

- use of metric units of length, their abbreviations, conversions between them, and appropriate levels of accuracy and choice of units

- use of imperial units for length (feet and inches only), their abbreviations, conversions between them, and an understanding of the contexts in which they are still used
- estimation of lengths
- conversions between metric units of length and other length units as appropriate
- calculate perimeters of familiar shapes, including: triangles, squares, rectangles, circles and composites of these
- review Pythagoras' Theorem and apply to solve practical problems in two dimensions.

Examples in context:

- *determining the dimensions/measurements of food packaging*
- *determining the length of the lines on a sporting field to find the cost of marking it*
- *in a practical situation, verify the square of a corner using Pythagoras' Theorem.*

Area measure:

- use metric units of area, their abbreviations, conversions between them and appropriate choices of units
- estimate areas of different shapes
- convert between hectares and acres
- use formulas to calculate areas of rectangles, triangles and circles.

Examples in context:

- *determining the area of the walls of a room for the purpose of painting*
- *compare the area of different house blocks of the same perimeter.*

Mass:

- use metric units of mass, their abbreviations, conversions between them and appropriate choices of units
- use imperial units of mass (pounds and ounces only), their abbreviations, conversions between them and appropriate choices of units
- estimate mass of different objects.

Examples in context:

- *comparing and discussing the components of different food types for the components of packaged food expressed as grams.*

Volume and capacity:

- use metric units of volume, their abbreviations, conversions between them and appropriate choices of units
- understand the relationship between volume and capacity, recognising that 1 cm^3 = 1 mL, and 1 m^3 = 1 kL
- estimate volume and capacity of various objects
- use formulas to find the volume and capacity of regular objects; cubes, rectangular and triangular prisms, cylinders and spheres.

Examples in context:

- *finding the volume of water collected from a roof under different conditions*
- *finding the volume of various packaging*
- *calculating and interpreting dosages for children and adults from dosage panels on medicines given age or weight.*

TABLES, GRAPHS, DIAGRAMS AND DATA

Tables, Graphs and Diagrams

Reading and interpreting tables, graphs and diagrams:

- interpret information presented in graphs, such as: conversion graphs, line graphs, step graphs, column graphs, pie graphs and picture graphs
- discuss and interpret graphs found in the media and in factual texts
- interpret and use two-way tables in real-life situations, such as rosters, schedules and more complex workplace situations
- recognise and describe trend patterns in tables and graphs
- read and interpret a map
- use a scale in maps and plans
- sketch plan and elevation views of a 3D solid.

Examples in context:

- *analysing and interpreting a range of graphical information of global weather patterns that affect food growth*

- *analysing and interpreting a range of graphical information given on gas and electricity bills*
- *interpreting graphs showing growth ranges for children (height or weight or head circumference versus age)*
- *interpreting hourly hospital charts showing temperature and pulse*
- *interpreting graphs showing life expectancy with different variables*
- *interpreting a step graph showing rates of taxation.*

Drawing tables and graphs:

- determine and use the most appropriate type of graph to best display a data set
- draw graphs from given data to represent practical situations
- use spreadsheets to tabulate and graph data
- use simple (linear) graphs to model real-life situations.

Examples in context:

- *expressing ingredients of particular food types as percentages of the total quantity, or per serving size, or per 100 grams, presenting the information in different formats. For example, column graphs, and pie graph.*
- *draw a line graph to represent any data that demonstrates a continuous change. For example, hourly temperature*
- *creating graphs to show the deductions from gross wages such as income tax, medicare levy, superannuation.*

Data

Classifying data:

- identify examples of categorical data
- identify examples of numerical data.

Data presentation and interpretation:

- display categorical data in tables and column graphs (see tables and graphs)
- display numerical data as frequency distributions, scatterplots and histograms
- compare the suitability of different methods of data presentation in real-world contexts.

Summarising and interpreting data:

- identify the mode and range
- calculate measures of central tendency; the arithmetic mean and the median
- investigate real-world examples from the media illustrating inappropriate uses, or misuses, of measures of central tendency and spread.

Examples in context:

- *analysing and interpreting a range of statistical information related to car theft, car accidents and driver behaviour*
- *using statistics and graphs to find the number of people in each blood type given the population percentages of blood types in different countries*
- *using blood usage statistics to predict the amount of blood needed at different times of the year*
- *investigate the relationship between a person's footprint size and their height in the context of crime scene investigations*
- *the candle clock: investigate the relationship between the length of a candle and the time that it has been burning.*

MONEY

- expression of a calculated amount to the nearest cent (e.g. 13.5489 = $13.55)
- the rounding of a total to the nearest 5 cents
- increasing or decreasing an amount by a given percentage (e.g. discounts, GST, etc...)
- calculation and management of money in real-life situations, including keeping financial records and budgeting
- using money in relation to measurement (e.g. price per kilo).

Examples in context:

- *practical experience in cash handling including mental reconciliation skills and counting back change after a transaction*
- *determining best value when the same item is offered in two sizes at different prices*
- *using tables to record transactions showing income and expenditure*
- *using tables to complete a basic single entry profit and loss statement*
- *using, where possible, technology associated with handling transactions such as a cash register, Eftpos machine, and computer*

- *investigating different ways of transacting business such as cash, cheque, electronic funds transfer, debit cards, credit cards, order form and charge accounts*
- *using a hardware store price list to prepare a budget for a project like adding a timber deck to a home*
- *understanding modes of financial record keeping. For example: pay slips, invoices, bank statements, credit card statements, cash books.*
- *investigating and compiling a glossary to define terms and jargon associated with handling money in work-based environments*
- *calculating simple interest*
- *investigating methods of getting paid: salary, wage, piece rate, commission*
- *investigating the different thresholds for 'Youth Allowance'*
- *investigating exchange rates*
- *calculating tax payment and terms*
- *completing a tax form for a given scenario*
- *discussing advantages/disadvantages of 'Do-It-Yourself' projects*
- *preparing a poster or presentation detailing tips for purchasing a car*
- *researching the costs involved in running a car*
- *investigating budgets using 'Essi Money' (a web-based scenario that puts learners in a real-life budget management situation)*
- *preparing a weekly or monthly budget for the living away from home situation.*

TIME AND MOTION

Time:

- use of units of time, conversions between units, fractional, digital and decimal representations
- represent time using 12 hour and 24 hour clocks
- calculate time intervals, such as: time between, time ahead, time behind
- interpret rosters, schedules, timetables and charts, such as: work rosters and schedules, tide charts, sunrise charts and moon phases.

Examples in context:

- *calculating reaction times through experiments*
- *using several timetables and electronic technologies to plan the most time efficient routes*
- *comparing time travelled by car with other modes of transport.*

Distance and Navigation:

- use scales to find distances on maps, such as: road maps, street maps, bushwalking maps, online maps and Cadastral Maps
- optimise distances through trial and error and systematic methods, such as: shortest path, routes to visit all towns and routes to use all roads
- solve practical problems using bearings.

Examples in context:

- *calculating distances travelled to school and the time taken to get from home to school considering different average speeds*
- *using a car GPS navigation system*
- *orienteering exercises*
- *using scales to find distances on maps, such as road maps, street maps, bushwalking maps, online maps and Cadastral (land survey) Maps.*

Speed:

- identify the appropriate units for different activities, such as: walking, running, swimming and flying
- calculate speed, distance or time using the formula speed = distance/time
- calculate the time for a journey from distances estimated from maps
- interpret distance versus time graphs
- calculate and interpret the average speed, such as: a 4 hour trip covering 250 km.

Examples in context:

- *calculating stopping distances for different speeds through use of formula for different conditions, such as road type, tyre conditions, types of vehicle.*

Assessment

Criterion-based assessment is a form of outcomes assessment that identifies the extent of learner achievement at an appropriate end-point of study. Although assessment – as part of the learning program – is continuous, much of it is formative, and is done to help learners identify what they need to do to attain the maximum benefit from their study of the course. Therefore, assessment for summative reporting to TASC will focus on what both teacher and learner understand to reflect end-point achievement.

The standard of achievement each learner attains on each criterion is recorded as a rating 'A', 'B', or 'C', according to the outcomes specified in the standards section of the course.

A 't' notation must be used where a learner demonstrates any achievement against a criterion less than the standard specified for the 'C' rating.

A 'z' notation is to be used where a learner provides no evidence of achievement at all.

Providers offering this course must participate in quality assurance processes specified by TASC to ensure provider validity and comparability of standards across all awards. To learn more, see TASC's quality assurance processes and assessment information.

Internal assessment of all criteria will be made by the provider. Providers will report the learner's rating for each criterion to TASC.

The following process will be facilitated by TASC to ensure there is:

- a match between the standards of achievement specified in the course and the skills and knowledge demonstrated by learners
- community confidence in the integrity and meaning of the qualification.

Process – TASC will verify that the provider's course delivery and assessment standards meet the course requirements and community expectations for fairness, integrity and validity of qualifications TASC issues. This will involve checking:

- learner attendance records; and
- course delivery plans (the sequence of course delivery/tasks and when assessments take place):
    - assessment instruments and rubrics (the 'rules' or marking guide used to judge achievement)
    - class records of assessment
    - examples of learner work that demonstrate the use of the marking guide
    - samples of current learner's work, including that related to any work requirements articulated in the course document
    - archived samples of individual learner's work sufficient to illustrate the borderline between that judged as 'SA' or 'PA'.

This process may also include interviews with past and present learners.

It will be scheduled by TASC using a risk-based approach.

The assessment for Workplace Maths Level 2 will be based on the degree to which the learner can:

1. communicate mathematical ideas and information
2. use an investigative approach to collect data, analyse it and draw conclusions
3. plan, organise and complete mathematical tasks
4. understand and apply numeric calculations in real-world situations
5. understand and apply concepts and techniques to measuring in real-world situations
6. understand and apply concepts and techniques through the use of tables, graphs, diagrams and data in real-world situations
7. understand and apply calculations involving money in real-world situations
8. understand and apply concepts and techniques to the study of time and motion in real-world situations

Standards

Criterion 1: communicate mathematical ideas and information

The learner:

Rating A	Rating B	Rating C
presents work that clearly conveys the line of reasoning that has been followed between question and answer	presents work that conveys the line of reasoning that has been followed between question and answer	presents work that shows some of the mathematical processes that have been followed between question and answer
consistently presents work that follows mathematical conventions, and consitently uses mathematical symbols correctly	generally presents work that follows mathematical conventions, and generally uses mathematical symbols correctly	uses mathematical conventions and symbols. There may be some errors.
presents work with the final answer clearly identified, and articulated in terms of the question as required	presents work with the final answer clearly identified	presents work with the final answer apparent
uses correct units of measure, and consistently presents the final answer with correct units of measure as required	uses correct units of measure, and generally presents the final answer with correct units of measure as required	uses correct units of measure, and sometimes includes them in an answer
consistently and accurately rounds whole numbers and decimals	generally rounds whole numbers and decimals accurately	rounds whole numbers and decimals. There may be some errors.
presents detailed tables, graphs and diagrams that convey accurate and precise information	presents detailed tables, graphs and diagrams that convey clear meaning	presents tables, graphs and diagrams that include some suitable annotations
uses suitable estimating strategies to ascertain the	checks the reasonableness of	checks the reasonableness of

reasonableness of solutions	solutions by suitably estimating and approximating	solutions by estimating or approximating. There may be some errors.
adds a diagram to illustrate and explain a solution.	adds a diagram to illustrate a solution.	adds a diagram to a solution as directed.

Criterion 2: use an investigative approach to collect data, analyse it and draw conclusions

The learner:

Rating A	Rating B	Rating C
follows written instructions to complete an investigation choosing appropriate mathematical analysis tools	follows written instructions to complete an investigation using suggested mathematical analysis tools	follows written and verbal instructions to complete an investigation using suggested mathematical analysis tools
selects from a range of given approaches and uses them to analyse data	uses given approaches for analysing data	uses simple, given approaches for analysing data
given written instructions, carries out an investigation and gathers accurate and precise data	given written instructions, carries out an investigation and gathers data	given written and oral instructions, carries out an investigation and gathers data
recognises when an investigation is producing anomalous data		
draws a detailed conclusion, that relates to gathered data, as required	uses a template approach to draw conclusions	
poses relevant extensions to an investigation		
relates experimental findings	describes relationships	identifies relationships

Rating A	Rating B	Rating C
to real-world phenomena and describes differences between the findings and what happens in the real world	between experimental findings and real-world phenomena	between experimental findings and real-world phenomena
assesses the reliability and validity of conclusions and suggests causes of error	assesses the reliability and validity of conclusions	undertakes simple assessments of the reliability and validity of conclusions
sources relevant research data and accurately cites the sources of information	sources relevant research data and cites the sources of information	when given specific location directions, sources relevant research data and cites the sources of information
performs and monitors own tasks and guides others in their contribution to the successful collection and analysis of data.	performs tasks within a group, and monitors and adapts own contribution to collecting and analysing data.	performs tasks within a group to contribute to collecting and analysing data.

Criterion 3: plan, organise and complete mathematical tasks

The learner:

Rating A	Rating B	Rating C
successfully solves complex problems in familiar and unfamiliar contexts	successfully solves problems in familiar contexts	successfully solves simple and straightforward problems in familiar contexts
assists others to divide a task into sub-tasks	divides a task into appropriate sub-tasks	divides a task into sub-tasks as directed
chooses appropriate strategies and formulae to successfully complete routine and complex problems	selects from a range of strategies and formulae to successfully	selects from a range of strategies and formulae to

	complete routine and complex problems	successfully complete routine problems
monitors and analyses progress towards meeting goals and timelines and plans future actions	monitors progress towards meeting goals and timelines	with prompting, monitors progress towards meeting goals and timelines
listens actively to class discussion and class problem-solving, and freely contributes ideas	listens actively to class discussion and class problem-solving, and occasionally contributes ideas	listens actively to class discussion and class problem-solving, and contributes ideas when asked
assists others (when appropriate) to maintain a task-focused approach, and works cooperatively when undertaking group project work.	maintains a task-focused approach, and works cooperatively when undertaking group project work.	works cooperatively when undertaking group project work.

Criterion 4: understand and apply numeric calculations in real-world situations

The learner:

Rating A	Rating B	Rating C
uses the algorithms for the four basic number operations correctly, and consistently maintains a high level of operational accuracy when working with both whole numbers and decimals	uses the algorithms for the four basic number operations correctly, and generally demonstrates a high level of operational accuracy when working with both whole numbers and decimals	uses the algorithms for the four basic number operations correctly, and generally demonstrates a high level of operational accuracy when working with whole numbers
describes the notions of, and relationships between, fractions, decimals, percentages and ratios, and performs worded problems with	describes the notions of, and relationships between, fractions, decimals, percentages and ratios, and uses them in worded	recognises fractions, decimals, percentages and ratios, and the relationships between them, and uses them

them, consistently with a high level of accuracy	problems, generally with a high level of accuracy	accurately in simple calculations
describes the notion of ratios and correctly applies them to practical situations involving complex conversions of units	describes the notion of ratios and correctly applies them to practical situations involving some conversion of units	recognises ratios and their application to practical situations
solves complex problems that involve some discernment of the approach to be used and frames them into mathematical symbols	solves straightforward contextual problems that involve some discernment of the approach to be used and frames them into mathematical symbols	solves contextual problems that involve some discernment of the approach to be used and frames them into mathematical symbols
accurately substitutes variables into an equation then completes simple manipulations to find an unknown that is not the subject of the equation	accurately substitutes variables into a complex equation to find an unknown that is the subject of the equation	accurately substitutes variables into a simple equation to find an unknown that is the subject of the equation
competently uses a calculator and performs calculations that involve the order of operations	competently uses a calculator and performs calculations that involve the order of operations	competently uses a calculator for straightforward calculations
applies a theoretical knowledge of calculation to a practical situation, identifying and allowing for differences between theory and real life.	applies a theoretical knowledge of calculation to a practical situation, identifying differences between theory and real life.	applies a theoretical knowledge of calculation to a practical situation.

Criterion 5: understand and apply concepts and techniques to measuring in real-world situations

The learner:

Rating A	Rating B	Rating C

performs complex calculations that involve measurements (e.g. how many jugs of a particular shape will it take to fill another container of a different shape?)	performs more complex calculations that involve measurements (e.g. area and perimeter of a compound figure – composed of several different shapes)	performs simple calculations that involve measurements (e.g. area and perimeter of a simple figure)
identifies metric and imperial measures and makes comparisons within and between the systems (e.g. which is larger: 1.5 kg or 1050 g, 1 cm or 1 inch?)	identifies metric and imperial measures and makes comparisons within the systems (e.g. which is larger: 1.5 kg or 1050 g, 37 inches or 2 ft 5 inches?)	identifies metric prefixes and makes simple conversions within the metric system (e.g. 1230 mm = 1.23 m)
applies Pythagoras' theorem to find the third side of a right-angled triangle when presented with a 2D worded practical problem	applies Pythagoras' theorem to find the third side of a right-angled triangle when presented as a 2D worded practical problem	applies Pythagoras' theorem to find the third side of a right-angled triangle when presented with a 2D practical problem in diagrammatic form
applies a theoretical knowledge of measurement to a practical situation, identifying and allowing for differences between theory and real life	applies a theoretical knowledge of measurement to a practical situation, identifying differences between theory and real life	applies a theoretical knowledge of measurement to a simple practical situation
makes accurate estimates of length, area, mass, and volume	makes accurate estimates of length and area	makes practical estimates of length, area, mass and volume
applies estimation in complex workplace-based and real-life scenarios (e.g. estimates how much paint should be purchased to paint a given room or the	applies estimation in workplace-based and real-life scenarios (e.g. how many stock items will fit on a shelf space?)	applies estimation in simple workplace-based and real-life scenarios (e.g. selecting a piece of wrapping paper to

amount of lawn seed required to seed a large plot)		cover a box, or the best plastic container to hold a specified quantity of deli food)
accurately uses and interprets a variety of precision measurement tools such as a stopwatch, feeler gauge, micrometer or thermometer, in work-based applications such as a mechanical workshop, kitchen or manufacturing plant.	accurately uses and interprets a variety of workplace specific tools, such as a tripometer, electronic scales, temperature gauge, pressure gauge, as used in work-based applications such as printing, cooking, spray painting or gas welding.	accurately uses and interprets a variety of simple and familiar measurement tools, such as a measuring tape and electronic bathroom scales.

Criterion 6: understand and apply concepts and techniques through the use of tables, graphs, diagrams and data in real-world situations

The learner:

Rating A	Rating B	Rating C
accurately interprets a range of graphs (including special purpose graphs, such as 3D representations, bubble graphs and radar graphs), maps and diagrams	interprets a range of graphs (including pie charts and broken scales), maps and diagrams	interprets simple graphs (pictograms, histograms and polygons), maps and diagrams
accurately constructs a range of standard graphs, making an appropriate selection of the best type of graph to use in any given situation	constructs a range of standard graphs and generally selects the best type of graph to use in a particular situation	following given instructions, constructs standard graphs for the best type of graph to use in a particular situation
identifies and explains when a particular presentation of a	identifies and discusses in simple terms when a particular presentation of a	identifies when a particular presentation of a

graph may be misleading to the reader	graph may be misleading to the reader	graph may be misleading to the reader
describes trends and patterns in tables and graphs that model real-life situations	explains trends and patterns in tables and graphs and uses simple linear graphs to model real-life situations	recognises some trends and patterns in tables and graphs, and that real-life situations can be modelled in a graph
uses spreadsheets to prepare a chart, extracts a graph from the chart, and devises and enters a formula into a chart	uses spreadsheets to prepare a chart, extracts a graph from the chart, and follows directions to enter a simple formula into a chart	uses spreadsheets to prepare a basic chart
interprets rosters, schedules and tables used in complex workplace situations (e.g. where the table may have to be interpreted in reverse. Given the outcome, find the conditions.)	interprets rosters, schedules and tables used in workplace situations (e.g. postal charges that may depend upon both weight in part-there-of units as well as distance carried)	interprets simple rosters, schedules and tables used in workplace situations
accurately displays numerical data in a range of formats, comparing the suitability of different methods	accurately displays numerical data in a range of formats, choosing a suitable method	displays numerical data in a range of given formats
identifies the mode and range, and calculates mean and median, for discrete tabulated frequency data	identifies the mode and range, and calculates mean and median, of a simple set of untabulated scores	identifies the mode and range of a simple set of untabulated scores
investigates and discusses the inappropriate uses of the mean and median, and spread.	describes the inappropriate uses of the mean and median, and spread.	identifies the inappropriate uses of the mean and median, and spread.

Criterion 7: understand and apply calculations involving money in real-world situations

The learner:

Rating A	Rating B	Rating C
makes a fast and accurate mental estimation of the total price of a number of items and the amount of change to be tendered from a given note	makes an appropriate mental estimation of the total price of a number of items and the amount of change to be tendered from a given note	makes an appropriate mental estimation of the total price of a number of items
completes complex calculations involving percentage (e.g. finding a sales representatives weekly pay that may be based on a retainer, plus a percentage commission on a sliding scale)	completes calculations involving percentage (e.g. find the % mark-up if a $52 item is sold for $76)	completes simple calculations involving percentage presented in numeric form (e.g. increase $56 by 12%)
completes complex calculations involving money that may use several pieces of information and devices such as tax schedules, commission schedules, or sliding scales and interest tables	completes calculations involving money that relates to several pieces of information (e.g. completes calculations that involve working out daily pay given the rate per hour and clock on clock off information)	completes simple calculations involving money that relates to measurement (e.g. measures the weight of a bag of fruit then works out its cost given the price per kilo or the preparation of a simple quotation)
interprets complex financial records by making checks on balances, interest calculations, etc	interprets financial records (e.g. pay slips, invoices, bank statements, credit card statements, cash books)	interprets basic financial records (e.g. pay slips, invoices)

uses the principals of basic financial management in the preparation, and simple analysis of, a detailed budget over an extended time period.	uses the principals of basic financial management in the preparation of a detailed budget over an extended time period.	uses the principals of basic financial management in the preparation of a simple budget.

Criterion 8: understand and apply concepts and techniques to the study of time and motion in real-world situations

The learner:

Rating A	Rating B	Rating C
performs simple calculations involving time, including time intervals, distance and speed	follows directions to perform simple calculations involving time, including time intervals, distance and speed	follows directions to perform simple calculations involving time and distance
draws a diagram to solve practical problems using bearings	using a given diagram, solves practical problems involving bearings	
interprets complex rosters, schedules and tables involving time and used in workplace and real-life situations	interprets rosters, schedules and tables involving time and used in workplace or real-life situations	interprets simple rosters, schedules and tables involving time and used in workplace or real-life situations
obtains distance information from a plan or map using a ratio scale (e.g. 1:100)	obtains distance information from a plan or map using a scale (e.g. 1 cm = 1 m)	obtains distance information from a plan or map using a scale
using a range of techniques and/or technologies, plans the most efficient route for a journey.	plans an efficient route for a journey.	compares different routes for a journey.

Relationship With The Australian Core Skills Framework (ACSF)

TASC recommends that providers use the ACSF to *guide understanding* of the appropriate levels of performance in the 5 core skills of Learning, Reading, Writing, Oral Communication and Numeracy as they relate to the course content.

Those participants aiming for an award that meets TCE standards requirements should be demonstrating the core skills at ACSF level 3 (or above) in reading and writing (to meet the everyday adult reading and writing standard) and/or in numeracy (to meet the everyday adult mathematics standard).

The performance features and sample activities of the ACSF are **not** in themselves equivalent to the TCE's 'everyday adult' standards. Rather they are *illustrative* of these standards.

The performance features and sample activities of the ACSF **do not** replace the criteria or standards in this TASC accredited course document.

The performance features and sample activities of ACSF level 3 can be used to *help* teachers develop and evaluate assessment instruments and can be used to *inform* final (summative) assessment judgements.

See the Australian Core Skills Framework for further information.

Qualifications Available

Workplace Maths Level 2 (with the award of):

EXCEPTIONAL ACHIEVEMENT

HIGH ACHIEVEMENT

COMMENDABLE ACHIEVEMENT

SATISFACTORY ACHIEVEMENT

PRELIMINARY ACHIEVEMENT

Award Requirements

The minimum requirements for an award in Workplace Maths Level 2 are as follows:

EXCEPTIONAL ACHIEVEMENT (EA)
7 'A' ratings, 1 'B' rating

HIGH ACHIEVEMENT (HA)
3 'A' ratings, 4 'B' ratings, 1 'C' rating

COMMENDABLE ACHIEVEMENT (CA)
4 'B' ratings, 3 'C' ratings

SATISFACTORY ACHIEVEMENT (SA)
6 'C' ratings

PRELIMINARY ACHIEVEMENT (PA)
4 'C' ratings

A learner who otherwise achieves the ratings for a SA (Satisfactory Achievement) award but who fails to show any evidence of achievement in one or more criteria ('z' notation) will be issued with a PA (Preliminary Achievement) award.

Course Evaluation

The Department of Education's Curriculum Services will develop and regularly revise the curriculum. This evaluation will be informed by the experience of the course's implementation, delivery and assessment.

In addition, stakeholders may request Curriculum Services to review a particular aspect of an accredited course.

Requests for amendments to an accredited course will be forwarded by Curriculum Services to the Office of TASC for formal consideration.

Such requests for amendment will be considered in terms of the likely improvements to the outcomes for learners, possible consequences for delivery and assessment of the course, and alignment with Australian Curriculum materials.

A course is formally analysed prior to the expiry of its accreditation as part of the process to develop specifications to guide the development of any replacement course.

The statements in this section, taken from documents endorsed by Education Ministers as the agreed and common base for course development, are to be used to define expectations for the meaning (nature, scope and level of demand) of relevant aspects of the sections in this document setting out course requirements, learning outcomes, the course content and standards in the assessment.

Australian Senior Secondary Curriculum: Essential Mathematics

Unit 1 - Topic 1: Calculations, percentages and rates

Calculations:

- solve practical problems requiring basic number operations (ACMEM001)
- apply arithmetic operations according to their correct order (ACMEM002)
- ascertain the reasonableness of answers to arithmetic calculations (ACMEM003)
- use leading-digit approximation to obtain estimates of calculations (ACMEM004)
- use a calculator for multi-step calculations (ACMEM005)
- check results of calculations for accuracy (ACMEM006)
- recognise the significance of place value after the decimal point (ACMEM007)
- evaluate decimal fractions to the required number of decimal places (ACMEM008)
- round up or round down numbers to the required number of decimal places (ACMEM009)
- apply approximation strategies for calculations (ACMEM010).

Percentages:

- calculate a percentage of a given amount (ACMEM011)
- determine one amount expressed as a percentage of another (ACMEM012).

Rates:

- identify common usage of rates; for example, km/h as a rate to describe speed, beats/minute as a rate to describe pulse (ACMEM014)
- convert units of rates occurring in practical situations to solve problems (ACMEM015)
- use rates to make comparisons; for example, using unit prices to compare best buys, comparing heart rates after exercise (ACMEM016).

Unit 1 - Topic 2: Measurement

Linear measure:

- use metric units of length, their abbreviations, conversions between them, and appropriate levels of accuracy and choice of units (ACMEM017)
- estimate lengths (ACMEM018)

- convert between metric units of length and other length units (ACMEM019)
- calculate perimeters of familiar shapes, including triangles, squares, rectangles, and composites of these (ACMEM020).

Area measure:

- use metric units of area, their abbreviations, conversions between them, and appropriate choices of units (ACMEM021)
  - estimate the areas of different shapes (ACMEM022)
  - convert between metric units of area and other area units (ACMEM023)
  - calculate areas of rectangles and triangles (ACMEM024).

Mass:

- use metric units of mass, their abbreviations, conversions between them, and appropriate choices of units (ACMEM025)
  - estimate the mass of different objects (ACMEM026).

Volume and capacity:

- use metric units of volume, their abbreviations, conversions between them, and appropriate choices of units (ACMEM027)
  - understand the relationship between volume and capacity (ACMEM028)
  - estimate volume and capacity of various objects (ACMEM029)
  - calculate the volume of objects, such as cubes and rectangular and triangular prisms (ACMEM030).

Unit 1 - Topic 3: Algebra

General substitution:

- substitute given values for the other pronumerals in a mathematical formula to find the value of the subject of the formula (ACMEM036).

Unit 1 - Topic 4: Graphs

Reading and interpreting graphs:

- interpret information presented in graphs, such as conversion graphs, line graphs, step graphs, column graphs and picture graphs (ACMEM037)
  - interpret information presented in two-way tables (ACMEM038)
  - discuss and interpret graphs found in the media and in factual texts (ACMEM039).

Drawing graphs:

- determine which type of graph is best used to display a dataset (ACMEM040)
  - use spreadsheets to tabulate and graph data (ACMEM041)
  - draw a line graph to represent any data that demonstrate a continuous change, such as hourly temperature (ACMEM042).

Unit 2 - Topic 1: Representing and comparing data

Classifying data:

- identify examples of categorical data (ACMEM043)
- identify examples of numerical data (ACMEM044).

Data presentation and interpretation:

- display categorical data in tables and column graphs (ACMEM045)
- display numerical data as frequency distributions, dot plots, stem and leaf plots, and histograms (ACMEM046)
- compare the suitability of different methods of data presentation in real-world contexts (ACMEM048).

Summarising and interpreting data:

- identify the mode (ACMEM049)
- calculate measures of central tendency, the arithmetic mean and the median (ACMEM050)
- investigate the suitability of measures of central tendency in various real-world contexts (ACMEM051)
- calculate and interpret statistical measures of spread, such as the range (part of ACMEM055)
- investigate real-world examples from the media illustrating inappropriate uses, or misuses, of measures of central tendency and spread (ACMEM056).

Unit 2 - Topic 3: Rates and ratios

Ratios:

- demonstrate an understanding of the elementary ideas and notation of ratio (ACMEM065)
- understand the relationship between fractions and ratio (ACMEM066)
- express a ratio in simplest form (ACMEM067)
- find the ratio of two quantities (ACMEM068)
- divide a quantity in a given ratio (ACMEM069)
- use ratio to describe simple scales (ACMEM070).

Unit 2 - Topic 4: Time and motion

Time:

- use units of time, conversions between units, fractional, digital and decimal representations (ACMEM076)
- represent time using 12-hour and 24-hour clocks (ACMEM077)
- calculate time intervals, such as time between, time ahead, time behind (ACMEM078)
- interpret timetables, such as bus, train and ferry timetables (ACMEM079)
- use several timetables and electronic technologies to plan the most time-efficient routes (ACMEM080).

Distance:

- use scales to find distances, such as on maps; for example, road maps, street maps, bushwalking maps, online maps and Cadastral Maps (ACMEM083)
- optimise distances through trial-and-error and systematic methods; for example, shortest path, routes to visit all towns, and routes to use all roads (ACMEM084).

Speed:

- identify the appropriate units for different activities, such as walking, running, swimming and flying (ACMEM085)
- calculate speed, distance or time using the formula speed = distance/time (ACMEM086)
- calculate the time or costs for a journey from distances estimated from maps (ACMEM087)
- interpret distance-versus-time graphs (ACMEM088)
- calculate and interpret average speed; for example, a 4-hour trip covering 250 km (ACMEM089).

Unit 3 - Topic 2: Scales, plans and models

Right-angled triangles:

- apply Pythagoras' theorem to solve problems (ACMEM116)
- solve problems involving bearings (ACMEM120).

Accreditation

The accreditation period for this course is from 1 January 2014 until 31 December 2018.

Version History

Version 1 – Accredited on 3 July 2013 for use in 2014 to 2018. This course replaces Workplace Maths (MTW215109) that expired on 31 December 2013.

Supporting documents including external assessment material

- MTW215114CourseAccreditation.pdf (2017-07-21 01:05pm AEST)