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## CERTIFICATE IV IN ADULT TERTIARY PREPARATION (10397NAT)

### FOUR WEEK INTENSIVE CLASSES - 19 NOVEMBER TO 14 DECEMBER

#### PURE MATHEMATICS (MATHEMATICS B) SPECIALISATION

The Pure Mathematics Specialisation applies to those who require foundation applied mathematics knowledge and skills for entrance to tertiary study in a relevant discipline or field.

There are three units of study within the Pure Mathematics Specialisation.

In Unit 1: ATPPMA401A students will learn to apply manipulative and problem solving skills to Pure Mathematics using introductory mathematical concepts, Linear Functions and Quadratics, and Trigonometry and Measurement. This unit will teach students to perform mathematical calculations and to solve problems which relate to Linear Functions and Quadratics, and to Geometry and Measurement as required for tertiary study in a relevant discipline. Knowledge to be gained in this unit:

Number concepts including describing real numbers such as integers, rationals and irrationals.

Linear functions:  $y=mx+c$ ; two simultaneous linear equations; distance between two points and mid-point formulae; and the relationship between parallel and perpendicular lines.

Quadratics:  $y= [ax]^2+bx+c$  ; and quadratic formula.

Trigonometry and measurement: definition of similar triangles; Pythagoras' theorem; formulae for length, area, total surface area and volume of common shapes; definition of  $\sin x$ ,  $\cos x$ , and  $\tan x$ .

The Performance Criteria for ATPGMA401A describes the required performance needed to demonstrate achievement of the element:

<p><b>1. Develop solutions to pure mathematical problems</b></p>	<p>1.1 Apply <i>pure mathematics knowledge and procedures</i> to the development of solutions to mathematical problems relating to number concepts, linear functions, quadratics, trigonometry and measurement.</p> <p>1.2 Assemble information into a coherent strategy for solving pure mathematical problems involving linear and quadratic functions, trigonometry and measurement.</p> <p>1.3 Use a <i>problem solving process</i>, mathematical calculations and sequences of mathematical procedures to develop a solution to pure mathematical problems.</p> <p>1.4 Use <i>mathematical reasoning</i> to draw conclusions and make judgments.</p>
<p><b>2. Communicate effectively about ideas, problems and information relating to pure mathematics</b></p>	<p>2.1 Convey mathematical ideas and information in a <i>genre/medium</i> appropriate to specific audience and purpose, using appropriate <i>mathematical language conventions</i></p> <p>2.2 Sequence ideas and information about pure mathematical concepts and problems involving number concepts, linear functions, quadratics, trigonometry and measurement logically for communication.</p>

In Unit 2: ATPPMA402A students will learn to apply manipulative and problem solving skills to Pure Mathematics using Relations and Functions, Probability and Statistics, Index Laws, and Exponential and Logarithmic Functions.

Knowledge to be gained in this unit:

Knowledge of Relations and Functions such as definitions of function, domain and range

The general shape and form of functions such as: linear; quadratic; cubic and other polynomials; familiar reciprocal; and irrational functions (e.g.  $y = \frac{1}{x}$ ,  $y = 1/x^2$ ,  $y = \sqrt{x}$ )

Probability and Statistics: mean, mode and median; range, interquartile range and standard deviation; linear regression and correlation; and normal distribution curves

Exponentials and Logarithms: index numbers; logarithms; and the general shape of exponential and logarithmic functions

Circular Function: typical aspects of simple periodic functions such as  $y = a \text{ sine } \{b(x + c)\} + d$

The Performance Criteria for ATPPMA402A describes the required performance needed to demonstrate achievement of the element:

<p><b>1. Develop solutions to pure mathematical problems</b></p>	<p>1.1 Apply <i>pure mathematics knowledge and procedures</i> to the development of solutions to mathematical problems relating to relations and functions, probability and statistics, index laws, exponential and logarithmic functions.</p> <p>1.2 Assemble information into a coherent strategy for solving pure mathematical problems.</p> <p>1.3 Use a <i>problem solving process</i>, mathematical calculations and sequences of mathematical procedures to develop a solution to pure mathematical problems.</p> <p>1.4 Use <i>mathematical reasoning</i> to draw conclusions and make judgments.</p>
<p><b>2. Communicate effectively on pure mathematical problems</b></p>	<p>2.1 Convey mathematical ideas and information in a <i>genre/medium</i> appropriate to specific audience and purpose, using appropriate <i>mathematical language conventions</i>.</p> <p>2.2 Sequence ideas and information about pure mathematical concepts and problems logically for communication.</p>

In Unit 3: ATPPMA403A students will learn to apply manipulative and problem solving skills to Pure Mathematics Calculus. Knowledge to be gained in this unit:

Differentiation by rule, i.e., if  $f(x) = ax^n$  then  $f'(x) = nax^{n-1}$

Tangents and normal

First and second derivative

Anti-derivatives/integrals/primitives

The Performance Criteria for ATPPMA403A describes the required performance needed to demonstrate achievement of the element:

<p><b>1. Develop solutions to pure mathematical problems using calculus</b></p>	<p>1.1 Apply <i>calculus knowledge and procedures</i> to the development of solutions to pure mathematical problems.</p> <p>1.2 Assemble information into a coherent strategy for solving pure mathematical problems.</p> <p>1.3 Use a <i>problem solving process</i>, mathematical calculations and sequences of mathematical procedures to develop a solution to pure mathematical problems using calculus.</p> <p>1.4 Use <i>mathematical reasoning</i> to draw conclusions and make judgments.</p>
<p><b>2. Communicate effectively about ideas, problems and information relating to calculus</b></p>	<p>2.1 Convey mathematical ideas and information in a <i>genre/medium</i> appropriate to specific audience and purpose, using appropriate <i>mathematical language conventions</i>.</p> <p>2.2 Sequence ideas and information about calculus concepts and problems logically for communication.</p>

November Intensive Pure Mathematics Timetable - 2018

Mon	Tue	Wed	Thu	Fri	Sat
<b>19 Nov</b> 8.30am – 1.00pm	<b>20 Nov</b> 8.30am – 1.00pm	<b>21 Nov</b> 8.30am – 1.00pm	<b>22 Nov</b> 8.30am – 1.00pm	<b>23 Nov</b> 8.30am – 1.00pm	<b>24 Nov</b>
<b>26 Nov</b> 8.30am – 1.00pm	<b>27 Nov</b> 8.30am – 1.00pm	<b>28 Nov</b> 8.30am – 1.00pm	<b>29 Nov</b> 8.30am – 1.00pm	<b>30 Nov</b> 8.30am – 1.00pm	<b>1 Dec</b>
<b>3 Dec</b> 8.30am – 1.00pm	<b>4 Dec</b> 8.30am – 1.00pm	<b>5 Dec</b> 8.30am – 1.00pm	<b>6 Dec</b> 8.30am – 1.00pm	<b>7 Dec</b> 8.30am – 1.00pm	<b>8 Dec</b>
<b>10 Dec</b> 8.30am – 1.00pm	<b>11 Dec</b> 8.30am – 1.00pm	<b>12 Dec</b> 8.30am – 1.00pm	<b>13 Dec</b> 8.30am – 1.00pm	<b>14 Dec</b> 8.30am – 1.00pm	