Stage 1 General Mathematics – Semester 1 (Example 1)

Topic 1: Investing & Borrowing Topic 2: Measurement & Topic 3: Statistical Investigation

|  | **Lesson 1 – Single Lesson** | **Lesson 2 – Single Lesson** | **Lesson 3 – Double Lesson** |
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| **Term One****Week 1**Mon 27th Jan | **Course Overview & Expectations** * Including what to bring to class
* Appropriate calculators
 | **TOPIC ONE: INVESTING AND BORROWING**Investing money* Why invest
* Where can we invest
* Types of investments
* Fees & charges
 | What is Simple interest and how do we do simple interest calculations:* Simple interest
* Principal
* Interest rate
* Time invested in years
* Total Return
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| **Week 2**Mon 3rd Feb | Introduction to compound interest via spreadsheet calculations | Compound interest* Derive the formula
* Use the formula to find future value, interest earned and present value
 | Use the compound interest formula to find future value, interest earned and present valueEffect of changing the compounding period |
| **Week 3**Mon 10th Feb | Annualised rates to compare investments | Compound interest using the graphic calculator* Future value
* Present value
* Interest
* Time
* Comparison rate on savings
 | Simple verses Compound interest, which is better? |
| **Week 4**Mon 17th Feb | Share Investments:* The basics about the share market
* Costs
* Risks
 | Cost of buying and selling shares | Share calculations* Breakeven point using brokerage rate and flat fee brokerage (formula only)
* Dividend return on shares
 |
| **Week 5**Mon 24th Feb | Expressing the return on an investment as a percentage of the original investment | The effect of tax and inflation on the real growth of the investment | **MATHEMATICAL INVESTIGATION 1**  |
| **Week6**Mon 3rd March | Credit Cards* Why
* Types
* Costs
 | Personal Loans* Fees/Charges
* Interest
 | **MATHEMATICAL INVESTIGATION 1** |
| **Week 7**Mon 10th March | Loans and Credit Cards verses Saving | REVISION | **INVESTING AND BORROWING** **SAT 1** |
| **Week 8**Mon 17th March | **TOPIC TWO: MEASUREMENT** Measurement review: * Measuring devices
* Metric system conversion
 | Accuracy of Measurements: * Estimating and measuring
* Rounding to significant figures
 | Absolute and percentage error calculations Scientific notation |
| **Week 9**Mon 24th March | Pythagoras theorem review | Perimeter of simple and composite shapes including circles, sectors, quadrilaterals and triangles. | Area units and there conversionArea of simple and composite shapes including circles, sectors, ovals, trapeziums and triangles |
| **Week 10**Mon 31st  March | Areas of irregular shapes using simple shapes | Areas of irregular shapes using Simpsons rule | Calculating the surface area of standard and composite shapes including prisms, pyramids, cones, cylinders and spheres  |
| **Week 11**Mon 7th April | Volume:* Units and how to convert between them
* Connection between volume and capacity
* How to convert between volume and capacity
 | Calculating the Volume of standard and composite shapes including prisms, pyramids, cones, cylinders and spheres  | Calculating the Volume of standard and composite shapes including prisms, pyramids, cones, cylinders and spheres Irregular volume calculations* Prismatic model
* Conical model
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| Term Two**Week 1**Mon 28th April | Scales:* How does a scale factor work
* Calculating actual lengths and scaled measurements
 | Scales:* Drawing scaled diagrams
* Determining scale factor
 | Scale problems involving area and volumes What is a rates and how do we convert between rates |
| **Week 2**Mon 5th May | REVISION | **MEASUREMENT** **SAT 2** | **TOPIC THREE: STATISTICAL INVESTIGATION** Students look at statistics presented and the statistical process that would have underpinned these statistics |
| **Week 3**Mon 12th May | Samples:* What is a sample
* Why do we sample
* Bias in samples
 | Sampling Methods and their advantages and disadvantages:* Simple random
* Stratified
* Systematic
 | Categorical data (Ordinal and Nominal) and how do we present this data (tables, bar and pie charts) |
| **Week 4**Mon 19th May | Numerical data (Discrete and Continuous) and how do we present it (dot plot, stem plot and histogram) | Numerical data (Discrete and Continuous) and how do we present it (dot plot, stem plot and histogram)Outliers, the effect on distributions and what should we do with them. | Calculation of measures of central tendency and spread:* Mean
* Median

How do we tell what is the most appropriate measure of the average? |
| **Week 5**Mon 26th May | Box and Whisker diagrams | Calculation of measures of central tendency and spread:* Range
* Interquartile range
* Standard Deviation
 | Impact of sample size |

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| **Week 6**Mon 2nd June | Putting it altogether for numerical data:* Graphical Representation
* Dealing with outliers
* Shape of the distribution
* Measures of centre of spread
* Argument to support conjecture
 | Putting it altogether for numerical data:* Graphical Representation
* Dealing with outliers
* Shape of the distribution
* Measures of centre of spread
* Argument to support conjecture
 | Putting it altogether categorical* Table of counts
* Graphical Representation
* Identification of the mode
* Calculation of proportions
* Argument to support conjecture
 |
| **Week 7**Mon 9th June | REVISION | **STATISTICAL INVESTIGATION** **SAT 3** | EXAM REVISION |
| **Week 8**Mon 16th June | EXAM REVISION | EXAM REVISION | **MID YEAR EXAM - FORMATIVE** |

General Mathematics – Semester 2

Topic 4: Applications of Trigonometry Topic 5: Linear Equations (Functions) & their graphs & Topic 6: Matrices & Networks

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|  | **Lesson 1 – Single Lesson** | **Lesson 2 – Single Lesson** | **Lesson 3 – Double Lesson** |
| Term Two**Week 9**Mon 23 June | Work Experience |
| **Week 10**Mon 30th June | **TOPIC FOUR: APPLICATIONS OF TRIGONOMETRY**Similar triangles* Conditions needed to prove similarity
* Using similar triangles to solve problems
 | Using similar triangles to solve problems in practical contexts | Review the use of Pythagoras’ rule and trigonometric ratios to solve contextual problems in 2D |
| Term Three**Week 1**Mon 21st July | Applying Pythagoras’ rule and trigonometric ratios to solve contextual problems in 3D | Area of non-right angled triangles using one angle and two sides | Area of non-right angled triangles using its three sides (Heron’s rule) |
| **Week 2**Mon 28th July | The Cosine Rule* Finding an unknown side
 | The Cosine Rule* Finding an unknown angle
 | The Sine Rule* Finding an unknown side
* Finding an unknown angle and the ambiguous case
 |
| **Week 3**Mon 4th Aug | Contextual applications of the sine and cosine rules | Problems involving bearings | REVISION |
| **Week 4**Mon 11th Aug | **APPLICATIONS OF TRIGONOMETRY** **SAT 1** | **TOPIC FIVE: LINEAR FUNCTIONS AND THEIR GRAPHS**Introduction to linear relationships * Description of the contextual linear relationship.
* Creating a table of values.
* Taking the table of values to a graph.
* What rule do we see?
 | Solving linear equations: * Description of the contextual linear relationship.
* Creating a table of values.
* Taking the table of values to a graph.
* Algebraic rule
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|  | **Lesson 1 – Single Lesson** | **Lesson 2 – Single Lesson** | **Lesson 3 – Double Lesson** |
| **Week 5**Mon 18th Aug | Solving linear relationship problems in context using graphs. | Solving problems using the algebraic rule* Substitution and Evaluation
* Rearrangement
* Solving linear equations
 | Looking at the links between the four methods of representing a linear relationship* Y -intercept
* Slope
 |
| **Week 6**Mon 25th Aug | Simultaneous equations* Finding where two lines meet on a graph (without electronic technology)
 | Simultaneous equations* Finding where two lines meet on a graph (without electronic technology)
 | Solving simultaneous equations with electronic technology* Graphically (including being able to rearrange equation to go into the calculator)
* Using the equation solver
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| **Week 7**Mon 1st Sept | Simultaneous equations* Non-unique solutions
 | Piecewise linear functions | **MATHEMATICAL INVESTIGATION 1** |
| **Week 8**Mon 8th Sept | Step Functions | Where do piecewise and step functions occur:* Construction of the formula
* Graphing these relationships
* Solving problems using algebraic and graphical representations
 | **MATHEMATICAL INVESTIGATION 1** |
| **Week 9**Mon 15th Sept | Where do piecewise and step functions occur:* Construction of the formula
* Graphing these relationships
* Solving problems using algebraic and graphical representations
 | REVISION | **LINEAR FUNCTIONS****SAT 2** |
| **Week 10**Mon 22nd Sept | **TOPIC SIX: MATRICES AND NETWORKS**What is a matrix? Where are they used?* Columns and rows
* Order
 | Multiplication by a scalarAdding and subtracting matrices | Using matrices to set up costing and stock control problems |

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| Term Four**Week 1**Mon 13th October | Matrix multiplication by hand | Multiplying by a row or column of 1’s | Matrices using a graphic calculator* Adding and Subtracting
* Scalar multiplication
* Matrix multiplication
 |
| **Week 2**Mon 20th October | Costing matrices problems | What does a network diagram tell you?* Reading information from a network diagram
* Deducing relationships
 | Networks and connectivity matrices |
| **Week 3**Mon 27th October | Powers of matrices and multi-stage connections (including limitation of higher powers) | Weighted sums of powers* Measures of efficiency or redundancy
* Prediction in dominance relationships
 | Connectivity and dominance problems Reasonableness of weightings and limitations of the model |
| **Week 4**Mon 3rd November | Transition Matrices* What can we use them for
* Setting up matrices

Predicting future trends |  2x2 Transition Matrices problems including: * The steady state
* Limitations of the matrix model
 | Transition Matrices* 3x3 or higher systems
 |
| **Week 5**Mon 10th November | Transition Matrices* 3x3 or higher systems
 | REVISION | **MATRICES SAT 3** |
| **Week 6**Mon 17th November | EXAM REVISION | EXAM REVISION | EXAM REVISION |
| **Week 7**Mon 24th November | EXAMINATION (formative) For students going onto Stage 2 General Maths, undertaking an exam is good preparation for what to expect in Stage 2. |