**Year 9 Maths Program 2015**

**Home Learning:** As a general rule it will be **set every Monday** and **due the following Thursday**. Please provide note (in diary or otherwise) if student was unable to complete home learning in time.

**Calculators:** A scientific calculator will be used throughout this course, with some units being calculator free.

**Tutoring:** Available Wednesday afternoons (unless otherwise specified) from 3:10 to 4:00 depending on student availability.

**Text:** Maths Quest 9 for the Australian Curriculum – Cahn et al

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<tr>
<th>Week</th>
<th>Content</th>
<th>Content Descriptions</th>
<th>Elaborations</th>
<th>Chapter</th>
<th>Assessment Task</th>
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</table>
| 1-3  | Financial Mathematics – 14  
- Salaries and wages – 1  
- Special rates – 2  
- Piecework – 1  
- Commission and royalties – 2  
- Loadings and bonuses – 2  
- Taxation and net earnings – 2  
- Simple interest – 2  
- Compound interest - 2  | • Solve problems involving simple interest. (ACMNA211) | • understanding that financial decisions can be assisted by mathematical calculations | 11 |  |
| 4    | Number Skills – 4  
- Real numbers – 2  
- Scientific notation – 2  | • Express numbers in scientific notation. (ACMNA210) | • representing extremely large and small numbers in scientific notation, and numbers expressed in scientific notation as whole numbers or decimals | 2 | Week 4: EPW 1  
Due Financial Mathematics (given week 2) |
| 5    | Indices – 6  
- Review – 2  
- Raising a power to another power – 2  | • Apply index laws to numerical expressions with integer indices. (ACMNA209)  
• Extend and apply the index laws | • simplifying and evaluating numerical expressions, using involving both positive and negative integer indices  
• understanding that index laws apply to variables as well as numbers | 10 | Week 5: Topic Test 1- Chapters 2 & 10 - Number Skills & Indices |
<table>
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<tr>
<th>Negative indices – 2</th>
<th>to variables, using positive integer indices and the zero index. (ACMNA212)</th>
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</table>
| 6-9 | **Algebra – 16**
  - Using pronumerals – 3
  - Worded problems – 1
  - Simplifying algebraic expressions – 2
  - Expanding brackets – 4
  - *Further expansions* – 2
  - Highest common factor – 3
  - The binomial factor – 1 |
| | • Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate. (ACMNA213) |
| | • understanding that the distributive law can be applied to algebraic expressions as well as numbers
| | • understanding the relationship between expansion and factorisation and identifying algebraic factors in algebraic expressions |
| 3 | **Week 9: Topic Test 2- Chapter 3 - Algebra** |

### Term 2

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| 1-3 | **Linear Equations – 11**
  - Solving linear equations – 3
  - Equations with brackets – 3
  - Pronumerals on both sides – 2
  - **Solving problems** – 2
  - **Rearranging formulas** – 1 | • Sketch linear graphs using the coordinates of two points and solve linear equations. (ACMNA215) | • determining linear rules from suitable diagrams, tables of values and graphs and describing them using both words and algebra | 4 | **Week 3: Topic Test 3- Chapter 4- Linear Equations** |
| 4 | **NAPLAN** | | | | |
| 5-7 | **Measurement – 15**
  - Measurement – 3
  - Area – 3
  - *Area/perimeter of a sector* – 2
  - Surface area of rectangular and triangular prisms – 3
  - Surface area of a cylinder – 2
  - Volume of prisms – 2 | • Calculate the areas of composite shapes. (ACMMG216)
  • Calculate the surface area and volume of cylinders and solve related problems. (ACMMG217)
  • Solve problems involving the surface area and volume of right prisms. (ACMMG218)
  • Investigate very small and very large time scales and intervals. (ACMMG219) | • understanding that partitioning composite shapes into rectangles and triangles is a strategy for solving problems involving area
  • analysing nets of cylinders to establish formulas for surface area
  • connecting the volume and capacity of a cylinder to solve authentic problems
  • solving practical problems involving surface area and volume of right prisms
  • investigating the usefulness of scientific notation in representing very large and very small numbers | 12 | **Week 7: Topic Test 4- Chapter 12 Measurement** |
| 8-9 | **Revision & Exam** | **Revision & Exam** | | | **Revision Packs** | **Week 9: Semester 1 Exam** |
10-11 Congruence and Similarity – 8
- Ratio and scale – 2
- Congruent figures – 2
- Similar figures – 3
- Area and volume – 1

- Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar. (ACMMG220)
- Solve problems using ratio and scale factors in similar figures. (ACMMG221)

- establishing the conditions for similarity of two triangles and comparing this to the conditions for congruence
- using the properties of similarity and ratio, and correct mathematical notation and language, to solve problems involving enlargement (for example, scale diagrams)
- using the enlargement transformation to establish similarity understanding that similarity and congruence help describe relationships between geometrical shapes and are important elements of reasoning and proof
- establishing the relationship between areas of similar figures and the ratio of corresponding sides (scale factor)

5 Week 11: EPW 2
Given
Expansion and area

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| 1-3  | Pythagoras and Trigonometry – 13 | - Investigate Pythagoras’ Theorem and its application to solving simple problems involving right angled triangles. (ACMMG222)  
- Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles. (ACMMG223)  
- Apply trigonometry to solve right-angled triangle problems. (ACMMG224) | - understanding that Pythagoras’ Theorem is a useful tool in determining unknown lengths in right-angled triangles and has widespread applications  
- recognising that right-angled triangle calculations may generate results that can be integers, fractions or irrational numbers  
- developing understanding of the relationship between the corresponding sides of similar right-angled triangles  
- understanding the terms ‘adjacent’ and ‘opposite’ sides in a right-angled triangle  
- selecting and accurately using the correct trigonometric ratio to find unknown sides (adjacent, opposite and hypotenuse) and angles in right-angled triangles | 6  
MQ 8 chapter 15 | Week 2: EPW 2  
Due Expansion and area (given week 11)  
Week 3: Topic Test 1- Chapters 5 & 6 – Congruence/Similarity & Pythagoras/Trigonometry |
| 4-7  | Linear and Non–Linear Graphs – 19 | - Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software. (ACMNA214)  
- Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software. (ACMNA294)  
- Sketch linear graphs using the coordinates of two points and solve linear equations. (ACMNA215)  
- Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations (ACMNA296) | - investigating graphical and algebraic techniques for finding distance between two points  
- using Pythagoras’ theorem to calculate distance between two points  
- investigating graphical and algebraic techniques for finding midpoint and gradient  
- recognising that the gradient of a line is the same as the gradient of any line segment on that line  
- determining linear rules from suitable diagrams, tables of values and graphs and describing them using both words and algebra  
- graphing parabolas, and circles connecting x-intercepts of a graph to a related equation | 7 | |
| 8-10 | Proportion and Rates – 11 | - Direct proportion – 3  
- Direct proportion and ratio – 2  
- Inverse proportion – 2  
- Introduction to rates – 1 | - identifying direct proportion in real-life contexts | 8 | Week 10: Topic Test 1- Chapters 7 & 8 – Linear/Non-Linear Graphs & Proportion/Rates |
### Term 4

#### Week 1-3: Probability – 14
- Theoretical probability – 2
- Experimental probability - 2
- Venn diagrams & two way tables – 3
- Two-step experiments - 2
- Mutually exclusive and independent events – 3
- Conditional probability – 2

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<tr>
<td>List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events. (ACMSP225)</td>
<td>conducting two-step chance experiments using systematic methods to list outcomes of experiments and to list outcomes favourable to an event</td>
<td>13</td>
<td>Week 3: Topic Test 3- Chapter 13 – Probability</td>
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<tr>
<td>Calculating relative frequencies from given or collected data to estimate probabilities of events involving ‘and’ or ‘or’. (ACMSP226)</td>
<td>comparing experiments which differ only by being undertaken with replacement or without replacement using Venn diagrams or two-way tables to calculate relative frequencies of events involving ‘and’, ‘or’ questions</td>
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<td>Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians. (ACMSP227)</td>
<td>using relative frequencies to find an estimate of probabilities of ‘and’, ‘or’ events investigating a range of data and its sources, for example the age of residents in Australia, Cambodia and Tonga; the number of subjects studied at school in a year by 14-year-old students in Australia, Japan and Timor-Leste</td>
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#### Week 4: CAMP

#### Week 5-6: Statistics – 9
- Sampling – 2
- Collecting data – 2
- Displaying data – 2
- Measures of central tendency – 2
- Measures of spread – 1

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<td>Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly from secondary sources. (ACMSP228)</td>
<td>comparing the annual rainfall in various parts of Australia, Pakistan, New Guinea and Malaysia using stem-and-leaf plots to compare two like sets of data such as the heights of girls and the heights of boys in a class</td>
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<td>Week 6: Topic Test 4- Chapter 14 – Statistics</td>
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<td>Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including ‘skewed’, ‘symmetric’ and ‘bi modal’. (ACMSP282)</td>
<td>describing the shape of the distribution of data using terms such as ‘positive skew’, ‘negative skew’ and ‘symmetric’ and ‘bimodal’ comparing means, medians and ranges of two sets of numerical data which have been displayed using histograms, dot plots, or stem and leaf plots</td>
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<td>Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread. (ACMSP283)</td>
<td>comparing means, medians and ranges of two sets of numerical data which have been displayed using histograms, dot plots, or stem and leaf plots</td>
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Assessment Grid Semester 2

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The timing of this program of work and the assessment is an approximation only and could be subject to change.

Year 9 Achievement standard

By the end of Year 9, students solve problems involving simple interest. They interpret ratio and scale factors in similar figures. Students explain similarity of triangles. They recognise the connections between similarity and the trigonometric ratios. Students compare techniques for collecting data in primary and secondary sources. They make sense of the position of the mean and median in skewed, symmetric and bimodal displays to describe and interpret data.

Students apply the index laws to numbers and express numbers in scientific notation. They expand binomial expressions. They find the distance between two points on the Cartesian plane and the gradient and midpoint of a line segment. They sketch linear and nonlinear relations. Students calculate areas of shapes and the volume and surface area of right prisms and cylinders. They use Pythagoras’ Theorem and trigonometry to find unknown sides of right-angled triangles. Students calculate relative frequencies to estimate probabilities, list outcomes for twostep experiments and assign probabilities for those outcomes. They construct histograms and back-to-back stem-and-leaf plots.

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