MADRAS COLLEGE
MATHEMATICS

NATIONAL 5
COURSE NOTES - OCT 2106

2016- 17 NATIONAL 5 OUTLINE S3/4

S3 Oct - Mar (20 weeks)	S3 Apr – Jun (11 wks)	S4 Aug – Oct (8 wks)	S4 Oct – Dec (8 wks)	S4 Jan – Mar(11 wks)
Exp & Form 1.1 Surds Indices Standard Form (6 weeks)	**Exp & Form 1.3** Algebraic Fractions (2 weeks)	**Rel 1.1 (cont)** Changing subject (2 weeks)	**Rel 1.2** Quadratic graphs (2 weeks)	**Apps 1.4** Line of best fit (1 week)
Exp & Form 1.4 Sig figs Arcs & sectors (2 weeks) **Christmas Holidays** Volumes of solids Gradient (3 weeks)	Equations of line (2 weeks) **May test** (1 week) Equations & Inequations (2 weeks) **Timetable change** Simultaneous Equations (3 weeks)	**Rel 1.4** Converse of Pythagoras Similarity Angles in semi-circle, Tangents (3 weeks)	**November revision** **(1 week)** **November test** **(1 week)**	**Apps 1.2** Vectors (2 weeks)
Exp & Form 1.2 Expanding brackets Factorising Completing the square (5 weeks)		**Rel 1.3** Quadratic Equations by Factorising Completing square Formula Discriminant (3 weeks)	**Apps 1.1** Area of triangle Sine Rule Cosine Rule (3 weeks)	**Revision (1 week)** **PRELIM EXAMS (2weeks)** **February Holiday**
Apps 1.3 Percentages Fractions (3 weeks)		**October Holidays**	**Apps 1.4** Standard Deviation (1 week) Line of best fit	**Rel 1.5** Trig graphs Trig equations Identities (3 weeks)
Easter Holidays				Preparation for final exam

Unit assessments should be completed at the end of each assessment standard (e.g. Exp & Form 1.1).
Assessments have been photocopied as complete units –these should be stored in the pupils' folders or as class sets and used when necessary.
Results should be entered into the database at your earliest convenience.

The text for the P and Q sets is L&L National 5 book. The R sets should use the TJ N5 textbook supplemented with the TJ Credit/Int 2 book where necessary i.e. Significant figures, volumes of solids, Angles in Semi circle/ tangents, similarity and standard form. There are a few examples covering these topics in the opening chapter but probably not enough practice for the course.

S3/4 NATIONAL 5 MATHS FOR 2016

Progression pathway for P/Q sets – complete all of the N5 units (both columns) and course work in S4 with the aim of sitting the N5 exam at the end of S4.
Progression pathway for R sets – achieve N5 units including numeracy (bridging or stand-alone unit/solar) in S4 and progress to course/ exam depth in S4 if possible or S5. Any pupil who progresses very well in S4 and manages to complete work to course standard, could have the opportunity to sit the exam at the end of S4 although this would likely be the exception to the rule. Most pupils in the R set will be aiming to sit the N5 exam in S5.

The topics in left column are the essential elements of the N5 course required for the unit assessments. Where a pupil is unable to pass the N5 unit, even after a resit, they should be given the related N4 unit as back up for the N4 award.

National 5 S3/4 All sets	P/Q - S3/4 R – S4/5
EXP & FORM 1.1 SURDS, INDICES & STANDARD FORM Understand surd notation Use the laws of indices Large numbers ←→ Standard form Small numbers ←→ Standard form Calculations **TJ N5 Ch 17 P 170 – 177** **Ch 0 P 5 Q 45 - 47** TJ BK2 P84-91	 Simplify, +, -, x, ÷ surds Rationalise denominators Understand zero, negative and fractional indices **L&L N5 Ch 1 P 2 – 12, Ch 2 P 13 – 26** S4³ P176-189

NAT 5 EXP & FORM 1.2 **EXPANDING BRACKETS** Expanding brackets • a(bx+c)+d(ex +f) • (ax+b)(cx+d) • ax(bx+c) **TJ N5 Ch 1 P 13 - 17** TJ BK1 P89-93 **FACTORISING** Common factor Difference of squares $x^2 - a^2$ Trinomials with unitary x^2 coefficient **TJ N5 Ch 7 P 65 - 69** TJ BK1 P94-97 **COMPLETING SQUARE** Completing the square **TJ N5 Ch 19 P 187 (plus extra Q)** S3³ P88-97	**EXPANDING BRACKETS** • $(ax+b)(cx^2+dx+e)$ {where a,b,c,d,e,f are integers } **L&L N5 Ch 3 P 27 – 34** S3³ P44,45,49-54 **FACTORISING** Common factor with difference of squares Trinomials with non-unitary x^2 Coefficient **L&L N5 Ch 4 P 35 – 41** **COMPLETING SQUARE** **L&L N5 Ch 5 P42 – 46**
EXP & FORM 1.3 ALGEBRAIC FRACTIONS Reducing an algebraic fraction to its simplest form Applying the four operations to algebraic fractions **TJ N5 Ch 9 P 90 – 95** TJ BK2 P16-25	**L&L N5 Ch 7 P 52 – 57** S4³ P117-129

NAT 5 EXP & FORM 1.4 **SIGNIFICANT FIGURES** Rounding to a given number of significant figures **TJ N5 Ch 0 P 1 Q 1, 2** TJ BK1 P15 **ARCS & SECTORS** Length of an Arc Area of a Sector **TJ N5 Ch 13 P 126 - 130** TJ BK1 P101-103 (Arcs & Sectors) **VOLUMES OF SOLIDS** Calculate the volume of Standard Solids Spheres, cones and Pyramids **TJ N5 Ch 0 P 8 Q 72 - 75** TJ BK1 Ch 8 P83-86 **GRADIENT** Determining the gradient of a straight line, given two points $m = \frac{(y2-y1)}{(x2-x1)}$ **TJ N5 Ch 6 P 50 - 51** TJ BK1 P60-	**L&L N5 Ch 11 P 84 – 88** S3³ P3-4 Working backwards to find angle/ radius **L&L N5 Ch 9 P 68 – 75** S3³ P192-197 Volume of composite shapes **L&L N5 Ch 10 P 76 – 83** **L&L N5 Ch 8 P 59 – 67**
S3 Exam / N4 Added Value	

RELATIONSHIPS 1.1 **EQUATIONS OF STRAIGHT LINES** Determine the equation of a straight line • Use the formula $y = mx + c$ • Use the formula $y - b = m(x - a)$ to find the equation of a straight line, given two points or one point and the gradient of the line. **TJ N5 Ch 6 P 52 - 61** TJ BK1 P57-58 TJ BK2 P209 TJ BK1 P60-67 S4³ P144-147 ($y = mx+c$) TJ BK2 P212-217 ($y-b = m(x-a)$) **EQUATIONS & INEQUATIONS** Solving Linear Equations and Inequalities **TJ N5 Ch 1 P 18, Ch 0 P 5 Q 42 – 44** TJ BK1 P136-14 **SIMULTANEOUS EQUATIONS** Algebraic Solution Application - Construct from text **TJ N5 Ch 4 P 35 - 42** TJ Cred 1 Ch 15 P162 – 169 **CHANGING THE SUBJECT OF A FORMULA** Linear equations **TJ N5 Ch 10 P 99 - 102** TJ BK2 P22-25	• Identify gradient and y-intercept values from various forms of the equation of a straight line. Use functional notation. **L&L N5 Ch 12 P 93 -110** Equations with brackets on both sides Equations with x^2 which cancel **L&L N5 Ch 13 P 111 – 118** S3-3 Ch 3 P 47 – 48, 55 – 56 S4³ P99-107 (equations) S4³ P110-113 (inequations) Sketching lines - Graphical Solution **L&L N5 Ch 14 P 119 – 130** S3³ P252-268 Equation involving a simple square or square root **L&L N5 Ch15 P 131 – 144** S4³ P88-93
RELATIONSHIPS 1.3 QUADRATIC EQUATIONS Finding the roots of Quadratic Equations; - factorising - quadratic formula Discriminant- basic properties	- completing the square - graphically Problem solving – creating and solving qusrdatic equations

TJ N5 Ch 19 P 187 - 194 TJ BK2 P60-61, 97-98	**L&L N5 Ch 19 P 183 – 203** S4³ P157-169
RELATIONSHIPS 1.2 QUADRATIC GRAPHS Recognise and determine the equations of quadratics $y = kx^2$ and $y = (x + p)^2 + q$ from their graphs Sketching a Quadratic Function in the form $y = (x – d)(x – e)$ and $y = (x + p)^2+q$ Identify the nature and coordinates of the turning point and the equation of the axis of symmetry of a quadratic in the form $y = k(x + p)^2 + q$ where $k = \pm 1$ Know the meaning of the term 'roots of a quadratic equation' **TJ N5 Ch 12 P 116 – 118** **Ch 14 P 132 - 139** TJ BK2 P65, P93-96	**L&L N5 Ch 16, 17, 18 P 145 – 178** S4³ P201-205
RELATIONSHIPS REL 1.4 **PYTHAGORAS THEOREM & CONVERSE** Converse of Pythagoras **TJ N5 Ch 5 P 44 - 48** TJ BK1 P17-26 **ANGLES IN SEMI CIRCLE / TANGENTS** Quadrilaterals / triangles / polygons / circles **TJ N5 Ch 0 P 9 Q 84, 85**	Distance Formula Using Theorem of Pythagoras in complex situations including converse of Pythagoras and 3D **L&L N5 Ch 20 P 204 – 216** S3³ P147-157 Relationship between the centre, chord and perpendicular bisector **L&L Ch 21 P217 – 236** TJ BK1 P107, 111 (perpendicular bisectors) S3³ P185-189 **L&L N5 Ch 22 P 237 – 247** S4³ P56-67 (triangles)

SIMILARITY Using similarity - the interrelationship of scale, length, area and volume **TJ N5 Ch 0 P 10 Q 91 - 94** TJ BK2 P52-57	S4³ P68-73 (area, volume)
RELATIONSHIPS 1.5 TRIG GRAPHS & EQUATIONS Graphs • Basic curves, max/min values and period • Scaling amplitude - vertical translation • Scaling period - multiple angle • **TJ N5 Ch 16 P 156 – 168** Equations • Sine, cosine and tangent of angles 0- 360 ^{o} • Related angles • Solving basic equations **Ch 20 p 196 -203**	Translation - Phase Angle TJ BK2 P70-82 (Graphs) S4³ P223-231 • Identities $\cos^2 x + \sin^2 x = 1$, $\tan x = \sin x / \cos x$ TJ BK2 P115-121 (Equations) S4³ P222-223, P232-237, P237-238 **L&L N5 Ch 23, 24 P 248 – 287**
APPLICATIONS 1.1 TRIGONOMETRY Area of a Triangle A=½ absinC Sine Rule to find sides & angles Cosine Rule to find sides & angles Basic understanding of bearings **TJ N5 Ch 8 P 70 - 88** TJ Cred 1 Ch 15 P 200- 215	Using bearings with trigonometry to find a distance or direction **L&L N5 Ch 25, 26, 27 P 292 – 310** S4³ P258-264

APPLICATIONS 1.2 VECTORS Adding or subtracting two dimensional vectors using directed line segments Interpreting three-dimensional coordinates Adding or subtracting two- or three-dimensional vectors using components Find magnitude of vector **TJ N5 Ch 15 P 141 - 144**	Interpret 3D directed line segments which are given in diagrams. Using skeleton diagrams. **L&L N5 Ch 28, 29, 30 P 311 – 323**
PRELIM EXAM and N5 NUMERACY BRIDGING UNIT	Probability Measuring
APPLICATIONS 1.3 PERCENTAGES & FRACTIONS Use reverse percentages to calculate an original quantity Appreciation including compound interest Depreciation **TJ N5 Ch 2 P 20 - 27** TJ BK1 P10-14 Simplifying fractions Operations with fractions +, -, x, ÷ including mixed numbers. **TJ N5 Ch 3 P 29 - 31** TJ BK1 P171-177	**L&L N5 Ch 31 P327 – 337** S3³ P65-66 S4³ P42-47 **L&L N5 Ch 32 P 338 -344** S3³ P13-14
APPLICATIONS 1.4 STANDARD DEVIATION Calculate mean and standard deviation **TJ N5 Ch 11 P 104 - 114** TJ BK1 P194-196 **LINE of BEST FIT** Determine the equation of a best-fitting straight line on a scatter graph and use it to estimate a y given x **TJ N5 Ch 18 P 179 - 182** TJ BK1 P149-151	Calculating quartiles and interquartile range and SIQR Using 5 figure summary to compare data TJ BK1 P188-192 S3³ P114-118, 234-236 MIA Nat 4 P 120 - 131 **L&L N5 Ch 33 P345 – 360** (St Deviation) **L&L N5 Ch 34 P 361 – 372** S3³ P240-245 S4³ P150-152