Wellington College Mathematics Department – *Year 10 End-of-Year Study Guide 2015*

Number

- Basic number skills - primes
  - multiples (LCM)
  - factors (HCF)
  - powers & square roots
- Order of operations (BEDMAS):
  - integers, decimals, fractions
  - use of calculators
- Fractions
  - simplify (+,–, x, ÷)
  - equivalent, improper & mixed
- Conversions - fractions ↔ % ↔ decimals
- Percentages - % of a quantity
  - 2 quantities as a %
  - % increase/decrease
  - discount, mark up, GST
  - reverse percentage
- Rates & ratio
- Rounding (dp, sf)
- Standard form

Algebra

- Simplifying - like terms (+, –)
  - powers (×, ÷)
  - roots $(\sqrt{\ })$
  - algebraic fractions (+,–, x, ÷)
  - expand brackets
  - factorise
- Linear Equations - solve
  - brackets, x terms on each side, fractions
  - change subject of formula
  - equations from context (words → algebra)
- Quadratic - expand brackets
  - factorise
  - perfect squares, diff. of 2 squares
  - solve quadratic equations
  - word problems
- Formulae – substitute & evaluate
  - rearrange subject of formula
- Patterns - rule → pattern
  - pattern → rule

Relations and Graphs

- Relations & coordinates (domain, range)
  - rule ~ table ~ ordered pairs ~ graphs
- Interpret graphs, recognise features
- Straight Lines - sketch by plotting points
  - gradient
  - intercepts on x & y axes
  - gradient/intercept form ($y = mx + c$)
  - other forms (eg $2x + 3y = 12$)
- Parabolas - sketch $y = x^2$, $y = x^2 + 2$
  $y = (x + 1)^2$, $y = -x^2$, $y = 3x^2$
  - others like $y = x^2 + 2x + 8$

Trigonometry (Right-angled triangles)

- Pythagoras
- Trig ratios - SOHCAHTOA
  - finding lengths
  - finding angles
- Applications - heights, bearings
  - 2-D & 3-D problems, navigation, etc.

Statistics

- PPDAC (the statistical enquiry cycle)
- Qualitative Data (gender, eye colour, etc)
- Quantitative Data (measured data – continuous or discrete)
- Collect & Organise Data - tally chart, frequency table
  - stem & leaf graph
- Display Data - bar graph (discrete)
  - histogram (continuous)
  - box & whisker graph (comparative analysis)
  - other types (pie graph, dot plot, pictogram, etc.)
  - pie graph
- Average (mean, median, mode)
- Spread (range, interquartile range)
- Analyse & Interpret data (use graphs, average & spread)
  - compare 2 sets of data
- Evaluate – sources of bias, limiting factors

Probability

- Describe probability (fractions ~ decimals ~ percentages)
- Sample space (lists ~ tables ~ tree diagrams)
- Theoretical Probability (coins ~ dice ~ cards)
- Experimental probability (relative frequency, tables)
- Probability trees
- Expected value

Geometry

- Angles: acute, right, obtuse, straight, reflex
  - vertically opposite angles
  - adjacent angles on a straight line
  - angles at a point
  - angles on parallel lines
  - bearings (angles measured clockwise from North)
- Circles - radius, diameter, circumference, arc
  - chord, sector, segment
  - angles at the centre
  - angles in a semi-circle
  - angles on the same arc
  - angle between a tangent and a radius
  - a triangle with 2 radii as sides is an isosceles triangle
- Triangles: equilateral, isosceles, scalene, right-angled
  - base angles of an isosceles triangle
  - interior angles of a triangle
  - exterior angle of a triangle
- Quadrilaterals & their properties - trapezium, parallelogram,
  - rhombus, rectangle, square, kite, arrowhead
- Properties of polygons - regular and irregular
  - sides, angles, symmetry
  - interior & exterior angles and their sums