Topics Covered In *MathCamp 2016*

1. **Arithmetic, Sets, Counting Rules**
   Significant digits; scientific notation; sets, complements, unions, intersections; Venn diagrams; logical operators; cardinality of complements, unions and intersections; factorials, permutations, combinations

2. **Probability**
   Probability rules for complements, union and intersection of events; mutually exclusive events; conditional probability; independent events; probability trees; probability tables

3. **Random Variables**
   Probability distribution; expected value; standard deviation and variance; joint probability distribution; covariance and correlation

4. **Algebra I**
   Linear and nonlinear functions; graphing linear functions, slope and intercept; determining the equation of a straight line; linear simultaneous equations

5. **Algebra II**
   Nonlinear functions; concave and convex functions; quadratic functions and their graphs; polynomial functions; power functions (x^a, x^{-a}, $x^{1/a}$), exponential functions (a^x, a^{-x}) and natural exponentiation (e^x, e^{-x}), logarithms and natural logarithms ($\ln x$); using a calculator for nonlinear functions

6. **Differential Calculus I**
   Notation; derivative as a local slope; derivatives of linear, polynomial, exponential and logarithmic functions; derivatives of sums of functions, products of functions, ratios of functions, composite functions

7. **Differential Calculus II**
   Increasing and decreasing functions; convex and concave functions; optimizing a function, maximum and minimum

8. **Compounding and Discounting**
   Compounding; future value; non-annual compounding periods; stated and effective annual interest rate; continuous compounding; discounting, net present value

9. **Annuities and Perpetuities**
   Sum of finite and infinite geometric series; perpetuity, growing perpetuity; annuity, growing annuity