

## Higher Level Mathematics Seminar Topics

### Leaving Cert 2019

#### Functions & Calculus (Differentiation & Integration) – Sunday, February 17<sup>th</sup>, 2019

- 1) Problems involving Rates of Change (**2D and 3D Applications**)
- 2) Maximum and Minimum Problems
- 3) Functions, **Composite Functions**, Functions of Functions and Inverse Functions
- 4) The Product, Quotient and Chain Rules and **Implicit Differentiation** (included in 2016)
- 5) Trigonometrical, Log and Exponential Functions (**applications in 2015's Paper 1**)
- 6) Inverse Trig. Functions with Applications
- 7) Exam Questions
- 8) Integration (Anti-Differentiation)
- 9) Indefinite Integration
- 10) Anti-Derivatives
- 11) Definite Integration and **Applications to Rates**
- 12) Areas between Curves
- 13) Numerical Integration (Trapezoidal Rule)
- 14) Average Value or Mean Value of an Integral **and Applications**
- 15) Summary
- 16) Exam Questions

#### Trigonometry, Line and Circle Seminar – Sunday, March 10<sup>th</sup>, 2019

- 1) Applications of Sine and Cosine Rules
- 2) Solving problems involving Pythagoras
- 3) The Sine, Cosine and Tangent Ratios for Right Angled Triangles and Applications
- 4) **Circular Measure** with Radians and Degrees (length of an Arc, Area of a Sector)
- 5) Proving Trigonometrical Identities
- 6) Solving Trigonometrical Equations
- 7) **General Solution** of Trig. Equations
- 8) 3D Trig. Problems (including the **Tetrahedron**)
- 9) Plotting / Graphing Sine and Cosine Curves
- 10) **Word Problems** involving Plotting of Sine and Cosine Curves
- 11) Equation of a Line – Slope and Intercept
- 12) **Intersecting** Lines involving areas
- 13) Perpendicular distance to a line and Perpendicular Lines
- 14) Area of a Triangle formed by lines
- 15) General Equations of a Circle (g,f,c) and (h,k)
- 16) Equations of Tangents to a Circle
- 17) Length of a Tangent to a Circle
- 18) Touching and Intersecting Circles
- 19) Image of a Circle under a Transformation
- 20) Intersecting Lines and Circles
- 21) Summary
- 22) Exam Questions

The Seminar will also focus on word problems related to sinusoidal problems (Sine and Cosine Curves).

#### Statistics and Probability Seminar – Sunday, May 12<sup>th</sup>, 2019

- 1) The basic laws of Probability
- 2) Using Venn Diagrams to solve probability Exam Questions
- 3) Bernoulli Trials and the Binomial Distribution
- 4) The Standard Normal Curve and Related Probabilities
- 5) Areas under the Standard Normal Curve – Symmetrical Properties
- 6) Hypothesis Testing – Rule of Thumb and z-Score
- 7) Hypothesis Testing of a Proportion
- 8) Hypothesis Testing of Difference between Means
- 9) Statistical Measures – Mean, Median and Mode
- 10) Measures of Dispersion – Standard Deviation and Variance
- 11) Frequency and Cumulative Frequency – Histogram and Ogive
- 12) Bar Chart, Histograms, Pie Charts and Line Charts
- 13) Linear Correlation and Linear Regression
- 14) Scatter Diagrams and Line of Best Fit
- 15) Applications of Linear Regression
- 16) Applications of Binomial and Normal Distributions
- 17) Permutations and Combinations
- 18) Geometric Series and Probability
- 19) Summary
- 20) Exam Questions

The Seminar will also focus on new problems related to Hypothesis Testing and Probability.