

Leaving Cert 2015 Mathematics Topics

Higher Level Mathematics Seminars

Functions, Differentiation and Integration Seminar (Sun, Feb 1st 2015)

This is a full day seminar (10am to 4pm) and will involve three sessions as follows:-

- Session 1 - Functions and Differentiation 1 (Basic, Rules, Logs and Trig)
- Session 2 - Differentiation 2 (Applications – Max/Min, Rates of Inc/Dec)
- Session 3 - Integration (Ant-derivatives, Trapezoidal Rule, Areas)

Topics

- 1) Introduction to Functions
- 2) Composite and Inverse Functions
- 3) Injective, Bijective, Surjective
- 4) Basic Differentiation
- 5) Product, Quotient, Chain
- 6) Differentiating Logs
- 7) Differentiating Trigonometrical Functions
- 8) Determining the Local Maxima and Local Minima of Cubic Polynomials
- 9) Rates of Change (Snowballs melting, Raindrops falling etc,etc)
- 10) What is Integration – Anti – Derivatives
- 11) Integration of algebraic, trigonometrical, exponential and Log functions
- 12) Numerical Integration as an approximation – Trapezoidal Rule
- 13) Areas under curves
- 14) Areas between curves

Trigonometry, Line and Circle Seminar (Sunday, March 1st 2015)

- 1) Applications of Sine and Cosine Rules to 2D and 3D Trigonometry Problems
- 2) Triangular and Square Based Trapeziums and Applications
- 3) General Solutions of $\sin(kx) = R$ and $\cos(kx) = R$
- 4) Plotting Curves of $R\sin(kx)$, $R\cos(kx)$ and $R\tan(kx)$
- 5) Using Trigonometry to find Areas of Polygons (Hexagons, Octagons etc, etc)
- 6) Applications of Tangent Ratios and Area of a Triangle
- 7) Slope, Intercept and Equation of a Line $ax + by + c = 0$ and $y = mx + c$
- 8) Angles between two lines and applications to areas
- 9) Perpendicular distance from a point to a Line and Applications
- 10) Parallel Lines and Applications
- 11) The two Equations of a Circle $(x-h)^2 + (y-k)^2 = R$ and $x^2 + y^2 + 2gx + 2fy + c = 0$
- 12) Equations of a Tangent to a Circle at a given Point and from an External Point
- 13) Intersecting and Touching Circles
- 14) Equations of Circles satisfying specific conditions

Please see topics for **Probability and Statistics Seminar** (Sunday, 10th May 2015) [on next page](#) →

Probability and Statistics Seminar (Sunday, May 10th 2015)

- 1) Coefficient of Linear Correlation and Linear Regression Line (Using Calculator)
- 2) Interpreting the Correlation Coefficient in Statistics Problems
- 2) The Binomial Distribution and Conditions for Bernoulli Trials
- 3) Applications of the Binomial Distribution (Tossing Coins, Basketball etc, etc)
- 3) The Standard Normal Distribution and Areas under the Standard Normal Curve
- 4) Applications of the Standard Normal Distribution to Probability Problems
- 5) Hypothesis Testing of Means and Proportions
- 6) Confidence Levels and Levels of Significance
- 7) Venn Diagrams and Conditional Probability Problems
- 8) The Probability Trees and Pyramids and Applications
- 9) Basic Probability Rules $P(A \cap B)$, $P(A \cup B)$, $P(A/B)$ and $P(B/A)$
- 10) Miscellaneous Probability Problems