

Final Exam Outline – MHF4U

Unit 1 – Polynomial Functions

- Composite Functions
- Division of Polynomial Expressions (long or synthetic division)
- Factoring Polynomials using the Factor Theorem
- Factoring Difference and Sum of Cubes
- Solving Polynomial Equations
- Sketching Polynomial Functions
- Finding Equation of a Polynomial Function (given zeroes or points – including complex roots)
- Solving Polynomial Inequalities (using a graph or table)

Unit 2 – Limits & Introduction to Calculus

- Evaluating Limits (using substitution, multiplying by conjugate, replacing variable)
- Slopes of Secants and Tangents (what each represents)
- Finding Derivatives Using Shortcuts (sum, product and constant rules)
- Finding Equation of a Tangent Line
- Using Calculus to Sketch Functions (critical points, end behaviour)

(no 1st principles on final exam)

Unit 3 – Logarithmic Functions

- Exponential Growth/Decay (compound interest, half-life, etc)
- Sketching Exponential Functions
- Finding the Inverse of an Exponential Function and Logarithmic Function
- Sketching Logarithmic Functions
- Laws of Logarithms
- Solving Exponential Equations
- Solving Logarithmic Equations

Unit 4 – Trigonometry

- Radian Measure, arc length, etc.
- Sketching Primary Trigonometric Functions and Word Problems based on graphs of sine and cosine.
- Sketching Graphs of Reciprocal Trigonometric Equations.
- Addition/Subtraction Identities
- Double Angle Identities
- Proving Trigonometric Identities
- Solving Trigonometric Equations

Unit 5 – Rational Functions

- Determining end behaviour of rational functions (using limits)
- Sketching Sums of Functions given Graphs
- Sketching Rational Functions as a Sum of Functions (from equation) using:
 - Using long/synthetic division
 - Using partial fractions
 - By graphing the reciprocal function
- Solving Rational Equalities
- Solving Rational Inequalities

Provided exam formulae:

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

$$\sin 2x = 2 \sin x \cos x$$

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\sin(A - B) = \sin A \cos B - \cos A \sin B$$