

# Year 13 Maths Preview Sheet

**Exam Board: Edexcel**

**Syllabus: 9MA0**

## Module 1

Functions and Graphs (Pages 22– 58)

- The modulus function
- Functions and mappings
- Composite functions
- Inverse functions
- $y = |f(x)|$  and  $y = f(|x|)$
- Combining transformations
- Solving modulus problems

Sequences and Series (Pages 59 – 90)

- Arithmetic sequences
- Arithmetic series
- Geometric sequences
- Geometric series
- Sum to infinity
- Sigma notation
- Recurrence relations
- Modelling with series

Binomial Expansion (Pages 91 – 112)

- Expanding  $(1 + x)^n$
- Expanding  $(a + bx)^n$
- Using partial fractions

Statistics

Correlation and Regression (Pages 1 – 15)

- Exponential models
- Measuring correlation
- Hypothesis testing for zero correlation

Probability (Pages 16 – 36)

- Set notation
- Conditional probability
- Conditional probabilities in Venn diagrams
- Probability formulae
- Tree diagrams

## Module 2

Radians (Pages 113 – 141)

- Radian measure
- Arc lengths
- Area of sectors and segments
- Solving trigonometrical equations
- Small angle approximations

Trigonometric Functions (Pages 142 – 165)

- Secant, Cosecant and Cotangent
- Graphs of  $\sec x$ ,  $\operatorname{cosec} x$  and  $\cot x$
- Using  $\sec x$ ,  $\operatorname{cosec} x$  and  $\cot x$
- Trigonometric identities
- Inverse trigonometric functions

Trigonometry and Modelling (Page 166 – 196)

- Addition formulae
- Using the addition formulae
- Double-angle formulae
- Solving Trigonometric equations
- Simplifying  $a \cos x \pm b \sin x$
- Proving trigonometric identities
- Modelling with trigonometric functions

Statistics

The Normal Distribution (Pages 37 – 64)

- The normal distribution
- Finding probabilities for normal distributions
- The inverse normal distribution
- Finding the mean and standard deviation
- Approximating a binomial distribution
- Hypothesis testing with the normal distribution

## Module 3

Parametric Equations (Pages 197 – 224)

- Parametric equations
- Using Trigonometric identities
- Curve sketching
- Points of intersection
- Modelling with Parametric equations

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## Differentiation (Pages 231 – 272)

- Differentiating  $\sin x$  and  $\cos x$
- Differentiating exponentials and logarithms
- The chain rule
- The product rule
- The quotient rule
- Differentiating trigonometric functions
- Parametric differentiation
- Implicit differentiation
- Using second derivatives
- Rates of change

## Numerical methods (Pages 273 – 292)

- Locating of root
- Iteration
- The Newton-Raphson method
- Application to modelling

## Mechanics

### Moments (Pages 70 – 89)

- Moments
- Resultant vectors
- Equilibrium
- Centre of mass
- Tilting

### Forces and Friction (Pages 90 – 106)

- Moments
- Resultant vectors
- Equilibrium
- Centre of mass
- Tilting

## Projectiles (107 – 127)

- Horizontal projection
- Horizontal and vertical components
- Projection at any angle
- Projectile motion formulae

## Module 4

### Integration (Pages 293 – 335)

- Integrating standard functions
- Integrating  $f(ax + b)$
- Using trigonometric identities
- Reverse chain rule
- Integration by substitution
- Integration by parts
- Partial fractions
- Finding areas
- The trapezium rule
- Solving differential equations
- Modelling with differential equations

### Vectors (Pages 336 – 357)

- 3D coordinates
- Vectors in 3D
- Solving geometric problems
- Applications to mechanics

## Mechanics

### Applications of Forces (Pages 128 – 158)

- Statics particles
- Modelling with statistics
- Friction and static particles
- Static rigid bodies
- Dynamics and inclined planes
- Connected particles

### Further Kinematics (Pages 159 – 181)

- Vector in kinematics
- Vector methods with projectiles
- Variable acceleration in one dimension
- Differentiating vector
- Integrating vectors

## Module 5

### Revision of the year