ST THOMAS MORE CATHOLIC SCHOOL
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Dear Parent/Carer, 5th May 2021

Further Maths GCSE Qualification 2021

The formal 'assessment window', where students will take tests based on examination board materials, will commence for all year groups on the 13th May. A range of evidence available will be used to determine grades but these additional assessments, taken under high control conditions, will help to provide further evidence to support the grade given to the students through the Centre Assessed Grade process.

The assessments for Further Maths will take place on:

- Friday 14th May - 14.10
- Thursday 20th May – 11.30

Topic lists have been discussed with students in their lessons so that students have a clear idea of what to prioritise for revision, this should enable them to focus their studies. A copy is attached for your information.

We are grateful for your continuing support throughout this period.

Yours sincerely,

Alex Rosen
Head of School

Level 2 Certificate in Further Maths – Year 10 Topic List

Numbers

- The product rule for counting
- Manipulation of surds, including rationalising the denominator

Algebra

- The basic processes of algebra
- Definition of a function
- Domain and range of a function
- Composite functions
- Inverse functions
- Expanding brackets and collecting like terms
- Factorising
- Manipulation of rational expressions: Use of + – × ÷ for algebraic fractions with denominators being numeric, linear or quadratic
- Use and manipulation of formulae and expressions R
- Use of the factor theorem for rational values of the variable for polynomials
- Completing the square
- Drawing and sketching of functions Interpretation of graphs
- Solution of linear and quadratic equations
- Algebraic and graphical solution of simultaneous equations in two unknowns, where the equations could both be linear or one linear and one second order
- Algebraic solution of linear equations in three unknowns
- Solution of linear and quadratic inequalities
- Index laws, including fractional and negative indices and the solution of equations
- Algebraic proof
- Using nth terms of sequences Limiting value of a sequence as $n \to \infty$
- nth terms of linear sequences
- nth terms of quadratic sequences

Coordinate Geometry

1. Straight lines

- Know and use the definition of a gradient
- Know the relationship between the gradients of parallel and perpendicular lines
- Use Pythagoras' theorem to calculate the distance between two points
- Use ratio to find the coordinates of a point on a line given the coordinates of two other points.
- The equation of a straight line $y = mx + c$ and $y – y1 = m (x – x1)$ and other forms
- Draw a straight line from given information

2. Circles

- Understand that $x^2 + y^2 = r^2$ is the equation of a circle with centre (0, 0) and radius r
- Understand that $(x – a)^2 + (y – b)^2 = r^2$ is the equation of a circle with centre (a, b) and radius r
- The equation of a tangent at a point on a circle

Calculus

- Know that the gradient function dy/dx gives the gradient of the curve and measures the rate of change of y with respect to x
- Know that the gradient of a function is the gradient of the tangent at that point.
- Differentiation of kx^n where n is an integer, and the sum of such functions
- The equation of a tangent and normal at any point on a curve
- Increasing and decreasing functions
- Understand and use the notation d^2y/dx^2
- Use of differentiation to find maxima and minima points on a curve
- Using calculus to find maxima and minima in simple problems
- Sketch/ interpret a curve with known maximum and minimum points

Geometry

1. Circle theorem
2. Trigonometry in triangles
   - Sine and cosine rules in scalene triangles
3. Pythagoras' theorem
   - Use of Pythagoras' theorem in 2D and 3D
   - Be able to apply trigonometry and Pythagoras' theorem to 2 and 3 dimensional problem
4. Ratios of angles and their graphs
   - Sketch and use graphs of $y = \sin x$, $y = \cos x$ and $y = \tan x$ for angles of any size
   - Be able to use the definitions $\sin \vartheta$, $\cos \vartheta$ and $\tan \vartheta$, for any positive angle up to 360° (measured in degrees only)
   - Knowledge and use of 30°, 60°, 90° triangles and 45°, 45°, 90° triangles
   - Know and use $\tan\theta = \frac{\sin\theta}{\cos\theta}$ and $sin^2\theta + cos^2\theta = 1$
   - Solution of simple trigonometric equations in given intervals

Matrix transformations

- Multiplication of matrices
  (Multiplying a 2 × 2 matrix by a 2 × 2 matrix or by a 2 × 1 matrix.
  Multiplication by a scalar
- The identity matrix (2 X 2 only)