

## Vectors studied by all students within Core 4 module of the A2 A level Maths course

- 5 Vectors
  - 5.1 Vector definitions and vector diagrams
  - 5.2 Vector arithmetic and the unit vector
  - 5.3 Using vectors to describe points in 2 or 3 dimensions
  - 5.4 Cartesian components of a vector in 2 dimensions
  - 5.5 Cartesian components of a vector in 3 dimensions
  - 5.6 Extending 2 dimensional vector results to 3 dimensions
  - 5.7 The scalar product of two vectors
  - 5.8 The vector equation of a straight line
  - 5.9 Intersecting straight line vector equations
  - 5.10 The angle between two straight lines

## Matrices studied by students who have covered FP1 module within the AS Further Maths course

- 4 Matrix algebra
  - 4.1 Finding the dimension of a matrix
  - 4.2 Adding and subtracting matrices of the same dimension
  - 4.3 Multiplying a matrix by a scalar (number)
  - 4.4 Multiplying matrices together
  - 4.5 Using matrices to describe linear transformations
  - 4.6 Using matrices to represent rotations, reflections and enlargements
  - 4.7 Using matrix products to represent combinations of transformations
  - 4.8 Finding the inverse of a  $2 \times 2$  matrix where it exists
  - 4.9 Using inverse matrices to reverse the effect of a linear transformation
  - 4.10 Using the determinant of a matrix to determine the area scale factor of the transformation
  - 4.11 Using matrices and their inverses to solve linear simultaneous equations

Vectors studied by students who have studied FP3 Module from the A2 F Maths course

5.1 the defn of a vector product of two vectors

5.2 interpreting  $|\mathbf{a} \times \mathbf{b}|$  as an area

5.3 Finding  $\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c})$  of three vectors and using it to find the vol of a parallelepiped and of a tetrahedron

5.4 Finding the vector equation of a line in the form;

$$(\mathbf{r} - \mathbf{a}) \times \mathbf{b} = 0$$

5.5 Writing the equation of a plane in the scalar vector or cartesian form

5.6 Using vectors in a variety of contexts

- points of intersection of lines and planes where they meet.
- angle between a line and a plane or between two planes
- shortest dist between lines and planes which don't meet
- shortest dist between a point and a plane or a line

Further Matrix Algebra studied by students who have studied FP3 Module from the A2 F Maths course

6.1 Finding the transpose

6.2 Finding the determinant of a 3x3 matrix

6.3 Finding the inverse of a 3x3 matrix where it exists

6.4 Using matrices to represent linear transformations in 3D

6.5 Using inverse matrices to reverse the effects of a linear transformation

6.6 Finding the eigenvectors and eigenvalues of 2x2 and 3x3 matrices.

6.7 Reducing a symmetrical matrix to diagonal form.