

# GRADE 11 MATHEMATICS CURRICULUM

## MATRICES -

Objectives - Students should be able to:

- explain basic concepts associated with matrices; concept of a matrix, row, column, square, identity rectangular, order.
- use matrix to show numerical information/ statistical data in rows and columns
- solve problems involving matrix operations;  
addition and subtraction of matrices of the same order.  
scalar multiples.  
multiplication of conformable matrices.  
equality, non-commutativity of matrix multiplication
- evaluate the determinant of a '2 x 2' matrix.
- obtain the inverse of a non-singular '2 x 2' matrix.
- use matrices to solve simple problems in Arithmetic, Algebra and Geometry.  
Use of matrices to solve linear simultaneous equations with two unknowns.
- determine a '2 x 2' matrix associated with a specified transformation;  
(a) Reflection in: the  $x$ -axis,  $y$ -axis, the lines  $y = x$  and  $y = -x$ .  
(b) Rotation in a clockwise and anticlockwise direction about the origin; the general rotation matrix.  
(c) Enlargement with centre at the origin

## VECTORS –

Objectives - Students should be able to:

- explain concepts associated with vectors; Concept of a vector, magnitude, unit vector, direction, scalar.  
parallel vectors, equal vectors, inverse vectors.
- perform simple scale drawings to represent movement of a given size in a given direction.
- simplify expressions involving vectors;  
vector algebra: addition, subtraction, scalar multiplication.  
resultant vector  
vector geometry: triangle law, parallelogram law.
- represent position vectors on the Cartesian Plane
- distinguish between displacement and position vectors.
- write the position vector of a point  $P(a, b)$  as  $\vec{OP} = (a \ b)$  where  $O$  is the origin  $(0,0)$ ;
- determine the magnitude of a vector;
- determine the direction of a vector
- use vectors to solve problems in geometry;

## GEOMETRY - TRANSFORMATION

Objectives - Students should be able to:

- define and describe Transformations.
- determine and represent the location of :
  - (a) the image of an object under a transformation;
  - (b) ) an object given the image under a transformation;

(Translation in the plane. Reflection in a line in that plane. Rotation about a point (the centre of rotation) in that plane. Enlargement in the plane).

- state the relationship between an object and its image in the plane under geometric transformations;
- completely describe a transformation given an object and its image  
Translation: vector notation.  
Reflection: mirror line/ axis of symmetry.  
Rotation: centre of rotation, angle of rotation, direction of rotation.  
Enlargement: centre, scale factor  $k$  such that  $|k| > 1$  or  $0 < |k| < 1$
- locate the image of an object under a combination of transformations;

## CIRCLE THEOREM –

Objectives - Students should be able to:

- investigate theorems of the circle
- solve geometric problems using properties of circles and circle theorems;

## LINEAR PROGRAMMING –

Objectives - Students should be able to:

- draw a graph to represent a linear inequality in two variables
- read and interpret information on graphs representing linear inequalities.
- use linear programming techniques to graphically solve problems involving two variables;