

GRADE 10 MATHEMATICS CURRICULUM

ALGEBRA –

Objectives - Students should be able to:

- evaluate expressions involving Binary Operations (other than the four basic operations).
- factorize expressions (revision)
- simplify algebraic fractions
- change the subject of Formulae
- re-write a quadratic expression in the form $a(x + h)^2 + k$, by Completing the Square and using Formula.
- solve quadratic equations algebraically (Factorization, Quadratic Formula and Completing the Square)
- solve a pair of equations in two variables when one equation is quadratic or nonlinear and the other linear
- represent direct and inverse variation symbolically and solve problems relating to both.

FUNCTIONS RELATIONS AND GRAPHS –

Objectives - Students should be able to:

- use functional notation
- evaluate a function $f(x)$ at a given value of x
- derive the composition of functions;
- state the relationship between a function and its inverse
- derive the inverse of a function
- evaluate $f(a)$, $f^{-1}(a)$, $fg(a)$, $(fg)^{-1}(a)$. (Showing that $fg(x) \neq gf(x)$, and $(fg)^{-1}(x) = g^{-1}f^{-1}(x)$)
- determine the intercepts of the graph of linear functions
- determine the gradient of a straight line
- determine from co-ordinates on a line segment:
 - (a) the length; and,
 - (b) the co-ordinates of the midpoint
- determine the equation of a straight line. Using:
 - (a) the graph of the line;
 - (b) the co-ordinates of two points on the line;
 - (c) the gradient and one point on the line;
 - (d) one point on the line or its gradient, and its relationship to another line.
- solve problems involving the gradient of parallel and perpendicular lines
- draw and use the graph of a quadratic function to identify its features:
 - (a) the maximum or minimum value of the function; and,

- (b) the equation of the axis of symmetry;
- (c) the interval of the domain for which the elements of the range may be greater than or less than a given point;
- (d) an estimate of the value of the gradient at a given point;
- (e) intercepts of the function;
- determine the equation of the axis of symmetry and the maximum or minimum value of a quadratic function expressed in the form $a(x + h)^2 + k$;
- sketch the graph of a quadratic function expressed in the form $y = a(x + h)^2 + k$ and determine the number of roots;
- draw and interpret graphs of non-linear functions; $y = a x^n$ where $n = -1, -2$ and $+ 3$ and 'a' is a constant. Including distance-time and speed-time.

GEOMETRY AND TRIGONOMETRY-

Objectives - Students should be able to:

- define the trigonometric ratios of acute angles in a right triangle;
- relate objects in the physical world to geometric objects;
Angle of elevation, angle of depression
- apply the trigonometric ratios to solve problems;
Spatial geometry and scale drawing, angles of elevation and depression
- use Pythagoras' theorem and the trigonometric ratios to solve problems in right angled triangles.
- use the sine and cosine rules to solve problems involving triangles (non-right angled).
- use trigonometry to find the area of triangles
- determine the relative position of two points given the bearing of one point with respect to the other
- determine the bearing of one point relative to another point given the position of the points.
- solve problems involving bearings.
- solve practical problems involving heights and distances in 3-dimensional situations.

STATISTICS AND PROBABILITY-

Objectives - Students should be able to:

- differentiate between sample and population attributes;
- distinguish between types of data: Raw, Grouped and Ungrouped
- construct a frequency table and interpret information for a given set of data;
Discrete and continuous variables. Ungrouped and grouped data.
- determine class features for a given set of data;
Class interval, class boundaries, class limits, class midpoint, class width.
- construct statistical diagrams;

Pie charts, bar charts, line graphs, histograms with bars of equal width and frequency polygons

- determine and interpret the measures of central tendency for raw, ungrouped and grouped data; Ungrouped data: mean, median and mode
Grouped data: modal class, median class and the estimate of the mean
- determine the measures of dispersion (spread) for raw, ungrouped and grouped data; Range, interquartile range and semi-interquartile range; estimating these measures for grouped data.
- use standard deviation to compare sets of data;
NB: No calculation of the standard deviation will be required.
- draw cumulative frequency curve (Ogive); NB: Class boundaries as domain
- analyse statistical diagrams: Finding the mean, mode, median, range, quartiles, interquartile range, semi-interquartile range; trends and patterns
- identify the sample space for simple experiment; Including the use of coins, dice and playing cards. The use of contingency tables.
- determine experimental and theoretical probabilities of simple events; The use of contingency tables. Addition for exclusive events; multiplication for independent events.
- make inference(s) from statistics. Raw data, tables, diagrams, summary statistics.

MEASUREMENT - MAP & SCALE

Objectives - Students should be able to:

- estimate the margin of error for a given measurement
- use scales and scale drawings to determine distances and areas; (Link to Geography)