ARMENIAN EVANGELICAL CENTRAL HIGH SCHOOL

MATH   Grade 10 (2014 – 2015)

Teacher: Shoghig Chekijian

<u>Objectives for the academic year for each topic</u>

I.   **Sets**
   1) Define set, element, subset.
   2) Perform operations on sets with intersection, union and complement.
   3) Distinguish between integers, decimals, quotients and irrationals.
   4) Apply the operations of sets on sets of numbers.
   5) Represent the solutions of numerical problems as intervals.
   6) Define absolute value.
   7) Solve problems with absolute value.

II.   **Powers**
   1) Define powers of real numbers with fractional exponents.
   2) Perform operations on numbers with fractional exponents.

III.   **Vectors**
   1) Construct addition of vectors.
   2) Calculate the norm of a vector sum.
   3) Define multiplication of a vector with a real number.
   4) Deduce the concept of collinear vectors.
   5) Derive the analytic form of collinearity of vectors.
   6) Decompose a vector to its components by Chalse's Relation.
   7) Solve geometry problems by using collinear vectors.

IV.   **Trigonometry**
   1) Define the oriented trigonometric circle and the regions.
   2) Convert the degree to radians.
   3) Determine the measures of an arc in the four regions.
   4) Define the trigonometric lines on the circle.
   5) Determine the sign of the trigonometric ratios on the four regions.
   6) Determine the trigonometric ratios of remarkable angles.
   7) Apply the principles of the oriented circle on associated arcs.

V.   **Coordinate System**
1) Define a system by its origin and unit vectors.
2) Find the relation between components and coordinates.
3) Derive analytic expressions of collinearity of vectors.
4) Use a system to prove properties.
5) Translate a system to a different origin.

VI.   **Equations in one or two unknowns**
1) Solve a first degree equation for the unknown.
2) Determine the possible solutions of an equation according to a parameter.
3) Solve a system of equations in two unknowns.
4) Determine the possible solutions of a system according to a parameter.
5) Transform word problems to equations.

VII.   **Inequalities**
1) Solve an inequality in one unknown.
2) Represent the solution of the inequality as an interval.
3) Determine the solution region of an inequality in the plane.
4) Solve a system of inequalities in two unknowns graphically.
5) Use the graphical representation to find the coordinates of points that satisfy the system of inequalities.

VIII. **Polynomials**
1) Divide of a polynomial by a binomial.
2) Determine one of the roots of a polynomial of the third degree.
3) Factorize a polynomial by long division.

IX.   **Counting**
1) Perform operations with the concept of factorial.
2) Use of the tree diagram.
3) Count the possible outcomes of a situation by using the tree diagram.
4) Differentiate between counting with or without repetition.
5) Deduce the formulas for p-list, permutation and arrangement.
6) Determine the product principle and the sum principle.

X. **Mapping**
1) Define a mapping from a set to another.
2) Represent the mapping with a Venn diagram, a table or a Cartesian system.
3) Define bijection between two sets.
4) Recognize the difference between mapping and bijection.

XI. **Equations of straight lines**
1) Define a straight line in the standard, reduced or parametric form.
2) Transform the equation of a line from a form to another.
3) Define the director vector.
4) Write the equation of a line by using the director vector.
5) Deduce analytic expression for parallelism of lines.
6) Distinguish the equations of special lines parallel to the axes.

XII. **Scalar product of vectors**
1) Define scalar product.
2) Derive the analytic formula for the scalar product.
3) Deduce the analytic formulas of norm, angle and distance from a line.
4) Use a system to determine scalar product of two vectors.
5) Define the norm of a straight line.
6) Deduce the orthogonality of lines from the scalar product.
7) Write the equation of a line perpendicular to a given line.

XIII. **Functions**
1) Determine the domain of definition of a function.
2) Distinguish between odd and even functions.
3) Deduce the existence of a line or point of symmetry.
4) Introduction to increasing and decreasing functions.
5) Make a table of variations for a given function.
6) Draw the graph of parabolic and hyperbolic functions.
7) Introduction to some graphical solutions.

XIV. **Statistics**
1) Tabulate data in classes of equal magnitude.
2) Calculate relative, increasing and decreasing frequencies.
3) Make a histogram and polygon of a distribution.