

**Federal Democratic Republic of Ethiopia
Ministry of Education**

Mathematics Syllabus, Grades 9 and 10

2009

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General Introduction

Mathematics learning at this cycle, should contribute towards educating students to be ready to take part in constructing the future society. At this level everything has to be done to develop personalities characterized by a scientific view of life, high moral qualities and readiness to take part in social activities. Each student should acquire a solid, applicable and extendable mathematical knowledge and develop the appropriate mathematical skills either to pursue with his/her study of preparatory school (Grades 11 and 12) mathematics or join the technical and vocational trainings after which he/she is able to participate in activities of shaping a new society. By including historical facts and real life applications from different fields of social life (agriculture, industry, trade, investment, etc) in word problems, students shall recognize that mathematics is playing an important role in the development of the country.

At this cycle, students should gain solid knowledge of fundamental mathematical notions, theorems, rules and procedures and develop reliable competencies in using this knowledge for solving problems independently.

General Objectives

Objectives of mathematics learning in the first cycle of the secondary education (Grades 9 and 10)

At this cycle students acquire and develop solid mathematics knowledge, skills and attitudes that significantly contribute to the creation of citizens who are conscious of the social, economic, political and cultural realities of Ethiopia and that can actively and effectively participate in the ongoing process of development of the country. To this end, the following are the objectives of mathematics learning at this cycle. Students will be able to:

- appreciate the power, elegance and structure of mathematics.
- use mathematics in their environment and social needs.
- understand the essential contribution of mathematics to Engineering, Science, Economics, Agriculture, etc.

It is important to identify and realize problems that cause challenging situations to the students and support them in formulating and solving the problems. Formulating and solving problems must be part of a methodical strategy. The task of the teacher is to facilitate in selecting and arranging the order of the problems, as well as helping and motivating students to solve the problems by themselves in a planned and organized way.

Stabilization must have a central place within mathematics learning. It begins with motivation and orientation, by selecting appropriate problems that were already discussed. Concepts that have not been mastered up to now have to be stabilized. A precondition for dealing with new content is always to ensure the necessary level of ability for solving problems. In mathematics learning as a whole, special emphasis has to be put on committing essential facts, notions, definitions, theorems and formulae to the students' memory as well as enabling students to reproduce and interpret what they have learnt in their own words. The main instruments used for stabilization in mathematics learning are activities and exercises.

- mathematical knowledge and skills to enable them pursue with their further education or future vocational trainings.
- gain satisfaction and enjoyment from learning and applying mathematics.
- develop their cognitive, creative and appreciative potential by relating mathematics with societal need.

Mathematics Syllabus: Grade 9 and 10

**Allotment of Periods
for Units and Sub-units of Mathematics
Grades 9 and 10**

| Grade | Unit | Sub-unit | Number of Periods | |
|---|--|--|-------------------|-------|
| | | | Sub-unit | Total |
| 9 | Unit 1: The number System | 1.1 Revision on the set of rational numbers 1.1.1 Natural numbers, integers, prime numbers and composite number 1.1.2 Common factors and common multiples | 3 | 33 |
| | | 1.2 The real number system 1.2.1 Representation of rational numbers by decimals 1.2.2 Irrational numbers 1.2.3 Real numbers 1.2.4 Exponents and radicals 1.2.5 The four operations on real numbers 1.2.6 Limits of accuracy 1.2.7 Standard form (Scientific notation) 1.2.8 Rationalization 1.2.9 Euclid's division algorithm | 30 | |
| | Unit 2: Solutions of Equations | 2.1 Equations involving exponents and radicals | 3 | 22 |
| | | 2.2 Systems of linear equations in two variables | 8 | |
| | | 2.3 Equations involving absolute value | 3 | |
| 2.4 Quadratic equations | | 8 | | |
| Unit 3: Further on Sets | 3.1 Ways to describe sets | 2 | 15 | |
| | 3.2 The notion of sets | 4 | | |
| | 3.3 Operations on sets | 9 | | |
| Unit 4: Relations and Functions | 4.1 Relations | 7 | 22 | |
| | 4.2 Functions | 6 | | |
| | 4.3 Graphs of functions | 9 | | |
| Unit 5: Geometry and measurement | 5.1 Regular polygons 5.1.1 Measures of each interior angle and each exterior angle of a regular polygon 5.1.2 Properties of regular polygons | 5 | 36 | |
| | 5.2 Further on congruency and similarity 5.2.1 Congruency of triangles 5.2.2 Definition of similar figures 5.2.3 Theorems on similarity of triangles 5.2.4 Theorems on similar plane figures | 13 | | |

Mathematics Syllabus: Grade 9 and 10

| Grade | Unit | Sub-unit | Number of Periods | |
|--------------|--|--|-------------------------------|--------------|
| | | | Sub-unit | Total |
| 10 | Unit 1: Polynomial function | 1.1 Introduction to polynomial functions 1.2 Theorems on polynomials 1.3 Zeros of a polynomial function 1.4 Graphs of polynomial functions | 5 6 4 5 | 20 |
| | Unit 2: Exponential and logarithmic functions | 2.1 Exponents and logarithms 2.1.1 Exponents 2.1.2 Logarithms 2.2 The exponential functions and their graphs 2.3 The logarithmic functions and their graphs 2.4 Equations involving exponents and logarithms 2.5 Applications of exponential and logarithmic functions | 6 5 6 7 6 | 30 |
| | Unit 3: Solving inequalities | 3.1 Systems of linear inequalities involving absolute value 3.2 Systems of linear inequalities in two variables 3.3 Quadratic inequalities | 4 5 11 | 20 |
| | Unit 4: Coordinate geometry | 4.1 Distance between two points 4.2 Division of a line segment 4.3 Equation of a line 4.4 Parallel and perpendicular lines | 2 2 8 3 | 15 |
| | Unit 5: Trigonometric functions | 5.1 Basic trigonometric functions 5.1.1 The sine, cosine and tangent functions 5.1.2 Trigonometric values of angles 5.1.3 Graphs of the sine, cosine and tangent functions. 5.2 The reciprocal functions of the basic trigonometric functions 5.3 Simple trigonometric identities 5.4 Real life application problems | 15 7 3 5 | 30 |
| | Unit 6: Plane geometry | 6.1 Theorems on triangles 6.2 Special quadrilaterals 6.3 More on circles 6.4 Regular polygons | 5 6 6 5 | 22 |
| | Unit 7: Measurement | 7.1 Revision on surface areas and volumes of prisms and cylinders 7.2 Pyramids, cones and spheres 7.3 Frustums of pyramids and cones 7.4 Surface area and volumes of composed solids. | 3 8 7 7 | 25 |