Mathematics Syllabus

Examination for the Enlistment of Personnel in the Armed Forces of Malta - June 2023

1. Introduction

This syllabus is designed for individuals sitting for the Mathematics examination as part of the soldier recruitment process in the Armed Forces of Malta. It focuses on skills and competences aligned with Level 7 of the Learning Outcomes Framework (2015) which is equivalent to the Year 8 Track 3 syllabus in State Secondary Schools.

The examination assesses the candidates' proficiency in using numbers and applying basic arithmetic operations, using linear algebra, knowing fundamental geometrical principles, working out mensuration and extracting, inferring, and interpreting information from tables, charts and graphs. Furthermore, the examination assesses the ability to apply mathematics to real-life situations. The use of calculator is allowed.

2. Assessment Criteria

2.1 Number and Operations

Candidates will be expected to:
- Read and write numbers in words.
- Read and recognise, understand, and use prime numbers, factors, prime factors and multiples.
- Understand and use the terms 'square' and 'square root', 'cube' and 'cube root' and use the corresponding notation e.g., 5^2, $\sqrt{16}$, 4^3, $\sqrt[3]{27}$.
- Understand and use index notation for positive integral powers (*e.g.,* 5^3, 2^4).
- Write numbers as a product of prime factors in index form.
- Identify common multiples and the Least Common Multiple of three numbers.
- Read scales in practical situations (*e.g., read a thermometer scale*).
- Simplify fractions and recognise equivalent fractions.
- Convert fractions to decimals and vice-versa.
- Order numbers (positive and negative numbers, fractions, decimals) or compare them using symbols such as <, > or = .
- Use the four operations (+, −, ×, ÷) in calculations involving positive and negative numbers, fractions, and decimals.
- Use the BIDMAS rule.
- Round to a specified number of decimal places.

2.2 Percentages and Consumer Mathematics

Candidates will be expected to:
- Convert fractions/decimals to percentages and vice versa.
- Find the percentage of a quantity.
- Express a quantity as a percentage of another.
- Work through situations involving percentage increase and decrease.
- Convert from one currency to another.
- Work through situations on personal and household finance involving earnings, simple interest, tax, and insurance.

2.3 Ratio and Proportion

Candidates will be expected to:
- Write ratios to their simplest form.
- Divide a quantity in a given ratio.
- Find one quantity of a ratio given another.
- Use ratio notation in practical situations (*e.g., map ratios and scale drawings*).
- Work through situations involving direct proportion.

2.4   Algebra

Candidates will be expected to:
- Recognize and extend pictorial and number sequences.
- Multiply linear terms (e.g., $x \times (-3x)$) and a single term over a bracket (e.g., $2(1-x) - 3(x+2)$) and simplify.
- Construct simple expressions, equations and formulas.
- Solve linear equations (e.g., $4(x-1) = 2x + 6$).
- Evaluate linear expressions by substitution.
- Change the subject of simple formulas.

2.5   Graphs

Candidates will be expected to:
- Understand and use the Cartesian coordinates in all four quadrants.
- Use the equation of a line $y = mx + c$, to find the value of the gradient and the y-intercept.
- Write the equation of a line given the gradient and the y-intercept.
- Use the equation of a line to find one coordinate given the other.
- Verify whether a line passes through a point.
- Know that parallel lines have equal gradients.
- Use and interpret graphs in practical situations. (*e.g. conversion graphs and travel graphs*).

2.6   Mensuration

Candidates will be expected to:
- Read and use the 12-hour and 24-hour clock, timetables, and calendar.
- Work through situations involving time, including time zones.
- Use metric units of mass, length, area, volume, and capacity in practical situations.
- Convert quantities of mass, length, and capacity in terms of larger and smaller units.
- Find the perimeter and area of triangles and quadrilaterals.
- Find the circumference and area of a circle and the area of a semicircle and quadrant.
- Find the area of compound flat shapes, involving the above-mentioned shapes.
- Find the surface area of a cubes and cuboids.
- Find the volume of cubes and cuboids and simple compound solid shapes involving cubes and cuboids.

2.7   Angles and Bearings

Candidates will be expected to:
- Use properties of angles at a point and angles on a straight line.
- Use properties of angles within parallel lines and transversals (i.e., vertically opposite angles, corresponding, alternate and interior angles).
- Use the angle properties and basic geometrical facts of triangles (equilateral, isosceles, scalene, and right-angled triangles).
- Use the angle properties and basic geometrical facts of quadrilaterals (square, rectangles, parallelograms, rhombus, trapezium and kite).
- Use the eight main compass directions.
- Use three-figure bearings.

2.8 Transformation Geometry

Candidates will be expected to:
- Symmetrical properties of simple flat shapes (including polygons).
- Identify reflections in vertical and horizontal lines.
- Identify 90° and 180° rotations of a shape about one of its vertices.
- Identify translations using a column translation vector.

2.9 Statistics and Probability

Candidates will be expected to:
- Read and interpret information in frequency tables that involve discrete and continuous data.
- Interpret bar charts and pie charts.
- Calculate and interpret the mean, mode, median and range.
- Describe the likelihood of an event occurring (e.g., *impossible, unlikely, evens, very likely, etc.*).
- Calculate the probability of a single event.
- Use a possibility space to find the probability of two combined events.

3. Examination Paper   Max 100 marks

The examination will be one and a half hours long. The paper will be divided into three sections and will consist of a total of 50 multiple-choice questions. All questions are compulsory. Each question carries 2 marks with a total of 100 marks.

- Section A will consist of 20 questions, with a total of 40 marks.
- Section B will consist of 20 questions, with a total of 40 marks.
- Section C will consist of 10 questions, with a total of 20 marks.

The questions will be graded throughout the paper. Section A will consist of questions requiring recall of facts or simple calculations. Questions in Section B will be of moderate difficulty, while Section C will consist of questions of higher level of difficulty, and which may involve more working. Each section may target any assessment criteria listed in the syllabus.