MATH 0110 Competency Test Topics

The Math 11 Competency Test assesses the mathematical topics and skills listed below. Once you have registered for a test, you will be emailed a test sample.

1 Numbers and arithmetic

- Identifying rational and irrational numbers.
- Performing arithmetic with signed integers and fractions.
- Applying the order of operations (BEDMAS).
- Working with exact answers and decimal approximations, and rounding appropriately.

2 Algebra exponents and radicals

- Evaluating formulas by substituting given values.
- Simplifying algebraic expressions using exponent laws, including zero, negative, and rational exponents.
- Converting between rational exponent notation and radical notation.
- Simplifying square roots and combining like radicals.
- Rationalizing denominators, including denominators containing two terms.
- Recognizing equivalent expressions involving powers and square roots.

3 Factoring polynomials

- Factoring out a greatest common factor.
- Factoring quadratic trinomials, including those with a leading coefficient other than one.
- Factoring differences of squares and perfect-square trinomials.
- Factoring expressions completely.

4 Rational expressions and equations

- Simplifying rational expressions.
- Operations on rational expressions using factoring and common denominators.
- Identifying non-permissible values from original expressions.
- Solving rational equations and checking solutions against the original equation and its restrictions.

5 Radical equations

- Solving equations containing a square root.
- Identifying domain restrictions.
- Checking solutions and rejecting extraneous solutions.

6 Quadratic equations and parabolas

- Solving quadratic equations by factoring and using the quadratic formula.
- Expressing solutions in exact radical form.
- Interpreting the number of real solutions using a parabola’s graph.
- Working with standard and vertex forms of quadratic functions.
- Determining unknown coefficients using a given vertex.
- Writing equations of parabolas with specified vertices or x-intercept properties.

7 Linear equations graphs and systems

- Working with the rectangular coordinate system.
- Determining the slope and x- and y-intercepts of a line.
- Graphing linear equations.
- Finding and interpreting the intersection of two lines.
- Translating a word problem into a system of two linear equations.
- Solving systems of two linear equations algebraically.

8 Inequalities

- Solving linear and quadratic inequalities in one variable.
- Expressing solutions using interval notation or a number line.
- Graphing the solution region of a linear inequality in two variables.

9 Geometry measurement and percentages

- Calculating areas of composite rectilinear figures.
- Calculating the area and perimeter of rectangles.
- Converting between square metres and square centimetres.
- Calculating and interpreting percentage changes in area and perimeter.
- Modelling changes in geometric dimensions using algebraic equations.
- Expressing slope as a percentage.

10 Trigonometry

- Applying the Pythagorean theorem.
- Using sine, cosine, and tangent to determine unknown sides or angles in right triangles.
- Applying the sine law and cosine law to non-right triangles.
- Drawing and labelling diagrams from written descriptions.
- Solving practical problems involving lengths, distances, and angles.

11 Financial mathematics

- Using a compound interest formula to calculate an investment's future value and interest earned.
- Converting annual interest rates to rates per compounding or payment period.
- Using a loan payment formula to calculate equal monthly payments.
- Calculating total loan repayments and borrowing costs.
- Comparing the costs of cash purchases and financed purchases.

Across all topics, students should be able to translate written information into mathematical expressions or equations, show their reasoning, use appropriate units, and check whether their answers are valid.

The actual competency test may differ in its questions, difficulty, and distribution of topics.