

MICHIGAN TEST FOR TEACHER CERTIFICATION (MTTC)

TEST OBJECTIVES FIELD 096: PROFESSIONAL READINESS EXAMINATION: MATHEMATICS SUBTEST

Subarea	Range of Objectives	Approximate Subtest Weighting
VII. Quantitative Literacy and Logic	007–009	20%
VIII. Algebra and Functions	010–012	30%
IX. Geometry and Trigonometry	013–015	30%
X. Statistics and Probability	016–019	20%

Effective after October 1, 2013

Copyright © 2013 Pearson Education, Inc. or its affiliate(s). All rights reserved.
Evaluation Systems, Pearson, P.O. Box 226, Amherst, MA 01004

Pearson and its logo are trademarks, in the U.S. and/or other countries, of Pearson Education, Inc. or its affiliate(s).

This document may not be reproduced for commercial use but may be copied for educational purposes.

MICHIGAN TEST FOR TEACHER CERTIFICATION

TEST OBJECTIVES

FIELD 096: PROFESSIONAL READINESS EXAMINATION: MATHEMATICS SUBTEST

VII. QUANTITATIVE LITERACY AND LOGIC

007 Understand numbers, numbers systems, and the relationships between them.

Includes:

- demonstrating knowledge of properties of integers, rational numbers, and real numbers (e.g., additive and multiplicative identities and inverses; associative, commutative, and distributive properties)
- using mathematical symbols in context to represent quantitative relationships and situations (e.g., inequalities, absolute values, vectors, logarithms, exponents, complex numbers)

008 Apply skills in performing calculations, using algorithms, and estimating solutions.

Includes:

- demonstrating knowledge of sequences and iteration (e.g., terms of arithmetic, geometric, and other simple sequences; sums of finite arithmetic and geometric sequences; the use of iterative processes in computing compound interest)
- applying skills related to measurement units and scales (e.g., units of measurement, conversion of units, calculations involving measurements and units)
- solving problems involving error analysis (e.g., significant digits, error tolerance, percent of error, accumulated error, rounding error, truncating)
- solving problems using number sense
- performing calculations involving real and complex numbers

009 Understand mathematical reasoning, logic, and proof.

Includes:

- demonstrating knowledge of inductive and deductive reasoning
- analyzing logical statements and arguments using the rules of logic (e.g., negation, contrapositive, inverse, converse, connectives)
- demonstrating knowledge of mathematical proofs (e.g., use of axioms, postulates, theorems, definitions, counterexamples, contradiction)
- demonstrating knowledge of necessary and sufficient conditions

Effective after October 1, 2013

Copyright © 2013 Pearson Education, Inc. or its affiliate(s). All rights reserved.
Evaluation Systems, Pearson, P.O. Box 226, Amherst, MA 01004

This document may not be reproduced for commercial use but may be copied for educational purposes.

TEST OBJECTIVES
FIELD 096: PROFESSIONAL READINESS EXAMINATION:
MATHEMATICS SUBTEST

VIII. ALGEBRA AND FUNCTIONS

010 Understand expressions, equations, and inequalities.

Includes:

- constructing and interpreting algebraic expressions (e.g., verbal descriptions of expressions in symbolic form, symbolic representation of verbal descriptions, evaluation of algebraic expressions)
- solving problems involving manipulation of algebraic expressions (e.g., performing operations, simplifying, factoring, transforming exponential and logarithmic expressions)
- demonstrating knowledge of linear, quadratic, polynomial, and rational equations and inequalities

011 Understand functions, their representations, and their characteristics.

Includes:

- recognizing definitions and representations of functions including piecewise functions and recursive functions (e.g., recognizing functions and their domains and ranges in contextual, symbolic, tabular, and graphical forms; evaluating functions at a value; representing functions in graphs, tables, diagrams, and words)
- solving problems involving operations on functions (e.g., addition, subtraction, multiplication, division, transformations, inverses)
- recognizing functions as applied to real-world situations (e.g., exponential growth and decay, cost function)

012 Understand families of functions and their symbolic and graphical representations.

Includes:

- solving problems involving lines and linear functions
- solving problems involving exponential and logarithmic functions
- solving problems involving quadratic functions
- solving problems involving power functions
- solving problems involving polynomial functions
- solving problems involving rational functions
- solving problems involving trigonometric functions

Effective after October 1, 2013

Copyright © 2013 Pearson Education, Inc. or its affiliate(s). All rights reserved.
Evaluation Systems, Pearson, P.O. Box 226, Amherst, MA 01004

This document may not be reproduced for commercial use but may be copied for educational purposes.

TEST OBJECTIVES
FIELD 096: PROFESSIONAL READINESS EXAMINATION:
MATHEMATICS SUBTEST

IX. GEOMETRY AND TRIGONOMETRY

013 Understand basic geometric figures and their properties.

Includes:

- demonstrating knowledge of coordinate geometry
- recognizing and using formulas involving perimeter, area, and volume
- solving problems involving geometry of two-dimensional figures (e.g., triangles, circles, quadrilaterals)
- solving problems involving geometry of three-dimensional figures (e.g., cone, pyramid, sphere)
- solving problems involving triangles and trigonometry

014 Understand the relationships between basic geometric figures.

Includes:

- recognizing the relationships between area formulas of two-dimensional figures
- recognizing the relationships between volume formulas of three-dimensional figures
- recognizing the relationship between two-dimensional and three-dimensional figures (e.g., recognizing three-dimensional figures from two-dimensional views, cross sections of three-dimensional figures, solids formed by revolving two-dimensional figures around lines)
- demonstrating knowledge of congruence and similarity

015 Understand transformations of figures in a plane.

Includes:

- recognizing isometries (i.e., reflections, rotations, translations, and glide reflections)
- recognizing dilations
- recognizing the composition of two or more transformations

Effective after October 1, 2013

Copyright © 2013 Pearson Education, Inc. or its affiliate(s). All rights reserved.
Evaluation Systems, Pearson, P.O. Box 226, Amherst, MA 01004

This document may not be reproduced for commercial use but may be copied for educational purposes.

TEST OBJECTIVES
FIELD 096: PROFESSIONAL READINESS EXAMINATION:
MATHEMATICS SUBTEST

X. STATISTICS AND PROBABILITY

016 Understand univariate data and distributions.

Includes:

- demonstrating knowledge of statistical significance, margin of error, and confidence level
- solving problems involving measures of center (i.e., mean, mode, median), weighted average, and variation (i.e., percentile, quartile, interquartile, range, variance, standard deviation)
- demonstrating knowledge of the normal distribution (e.g., shape, relationships between measures of center, percent of population at various standard deviations from the mean, z-scores)

017 Understand bivariate data and relationships.

Includes:

- demonstrating knowledge of scatterplots and their characteristics
- demonstrating knowledge of Pearson's coefficient of correlation
- differentiating between correlation and causation
- demonstrating knowledge of linear regression

018 Understand sampling, surveying, experimental design, and graphical representation.

Includes:

- constructing and interpreting graphic representations of data (e.g., tables, charts, plots, graphs, spreadsheets, histograms, bar graphs)
- demonstrating knowledge of sample statistics and population parameters
- demonstrating knowledge of sources of bias and procedures for reducing and controlling bias
- demonstrating knowledge of observational studies and experimental studies

019 Understand probability models and probability calculation.

Includes:

- demonstrating knowledge of sample spaces in simple situations
- calculating the probability of events in various situations (e.g., mutually exclusive events, independent events, dependent events, compound events, complementary events, conditional events)
- demonstrating knowledge of tree diagrams, formulas for combinations and permutations, Venn diagrams, and other counting techniques

Effective after October 1, 2013

Copyright © 2013 Pearson Education, Inc. or its affiliate(s). All rights reserved.
Evaluation Systems, Pearson, P.O. Box 226, Amherst, MA 01004