

Course Syllabus

Mathematics, Geometry

Morgan County Curriculum 4.1 High School, Final
Morgan County School District

Successful completion of GEOMETRY is REQUIRED for graduation.

Students are assessed in Mathematics through the Commonwealth Assessment Testing System (CATS).

The Kentucky Core Content Test (KCCT) in mathematics is given in grade 11 and consists of 38 Multiple-Choice and five (5) Open Response items.

Eleventh grade students will also take the American College Test (ACT). The ACT assesses students' general educational development and their ability to complete college-level work. The Mathematics section of the ACT contains 60 Multiple-Choice questions: 24 questions dealing with pre-algebra and elementary algebra; 18 questions dealing with intermediate algebra and coordinate geometry; 14 questions dealing with geometry; and four questions dealing with trigonometry.

Tenth grade students will take the PLAN, a curriculum-based assessment program developed by the American College Testing Program (ACT) to help students plan their academic careers and prepare for entry into college or the world of work. The test consists of 40 Multiple-Choice Questions dealing with pre-algebra, elementary algebra, coordinate geometry and plane geometry content.

Upon reviewing assessment results, the Morgan County High School will help the student and parent to determine what courses their child needs to take during their high school career, utilizing the Individual Learning Plan (ILP)

Number Properties and Operations (20%)

- 1.1.1 (Supporting)
The learner will be able to compare real numbers using order relations (less than, greater than, equal to) and represent problems using real numbers.
- 1.2.1 (Supporting)
The learner will be able to estimate solutions to problems with real numbers (including very large and very small quantities) in both real-world and

mathematical problems, and USE the estimations to check for reasonable computational results.

- 1.3.1 (DOK 2) ASSESSED
The learner will be able to solve real-world and mathematical problems to specified accuracy levels by simplifying expressions with real numbers involving addition, subtraction, multiplication, division, absolute value, integer exponents, roots (square, cube) and factorials.
- 1.4.1 (DOK 2) ASSESSED
The learner will be able to apply ratios, percents and proportional reasoning to solve real-world problems (e.g., those involving slope and rate, percent of increase and decrease) and will EXPLAIN how slope determines a rate of change in linear functions representing real-world problems.
- 1.5.1 (Supporting)
The learner will be able to identify real number properties (commutative properties of additions and multiplication, associative properties of addition and multiplication, distributive property of multiplication over addition and subtraction, IDENTIFY properties of addition and multiplication and inverse properties of additions and multiplication) when used to justify a given step in simplifying an expression or solving an equation.
- 1.5.2 (Supporting)
The learner will be able to use equivalence relations (reflexive, symmetric, transitive).

Measurement (12%)

- 2.1.1 (DOK 2) ASSESSED
The learner will be able to determine the surface area and volume of right rectangular prisms, pyramids, cylinders, cones and spheres in real-world and mathematical problems.
- 2.1.2 (DOK3) ASSESSED
The learner will be able to describe how a change in one or more dimensions of a geometric figure affects the perimeter, area and volume of the figure.

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■ 2.1.3 (DOK 3) ASSESSED

The learner will be able to apply definitions and properties of right triangle relationships (right relationships trigonometry and the Pythagorean theorem) to determine length and angle measures to solve real-world and mathematical problems.

■ 2.1.4 (ADP, Supporting)

The learner will be able to apply special right triangles and converse of the Pythagorean theorem to solve real-world problems.

■ 2.2.1 (Supporting)

The learner will be able to continue to APPLY to both real-world and mathematical problems U.S. customary and metric systems of measurements.

Geometry (18%)

■ 3.1.1 (DOK 2) ASSESSED

The learner will be able to analyze and APPLY spatial relationships (not using Cartesian coordinates) among points, lines and planes (e.g., betweenness of points, midpoint, segment length, collinear, coplanar, parallel, perpendicular, skew).

■ 3.1.2 (ADP, Supporting)

The learner will be able to use spatial relationships to prove basic theorems.

■ 3.1.3 (DOK 2) ASSESSED

The learner will be able to analyze and APPLY angle relationships (e.g., linear pairs, relationships, complementary, supplementary, corresponding and alternate interior angles) in real-world and mathematical problems.

■ 3.1.4 (ADP, Supporting)

The learner will be able to use angle relationships to prove basic theorems.

■ 3.1.5 (DOK 2) ASSESSED

The learner will be able to classify and APPLY properties of two-dimensional geometric figures (e.g., number of sides, vertices, length of sides, sum of interior and exterior angle measures).

■ 3.1.6 (ADP, Supporting)

The learner will be able to know the definitions and basic properties of a circle and will USE them to provide basic theorems and solve problems.

■ 3.1.7 (DOK 2) ASSESSED

The learner will be able to solve real-world and mathematical problems by APPLYING properties of triangles (e.g., Triangle Sum theorem and Isosceles Triangle theorems).

■ 3.1.8 (ADP, Supporting)

The learner will be able to use the properties of triangles to prove basic theorems.

■ 3.1.9 (DOK 2) ASSESSED

The learner will be able to classify and APPLY properties of three-dimensional geometric figures.

■ 3.1.10 (Supporting)

The learner will be able to describe the intersection of a plane with a three-dimensional figure.

■ 3.1.11 (ADP, Supporting)

The learner will be able to visualize solids and surfaces in three-dimensional space when given two-dimensional representations (e.g., nets, multiple views) and CREATE two-dimensional representations for the surfaces of three-dimensional objects.

■ 3.1.12 (DOK 3) ASSESSED

The learner will be able to apply the concepts of congruence and similarity to SOLVE real-world and mathematical problems.

■ 3.1.13 (ADP, Supporting)

The learner will be able to prove triangles congruent and similar.

■ 3.2.1 (DOK 3) ASSESSED

The learner will be able to identify and DESCRIBE properties of and APPLY geometric transformations within a plane to solve real-world and mathematical problems.

■ 3.3.1 (DOK 2) ASSESSED

The learner will be able to apply algebraic concepts and graphing in the coordinate plane to ANALYZE and SOLVE problems (e.g., finding the final coordinates for

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a specified polygon, midpoints, between-ness of points, parallel and perpendicular lines, the distance between two points, the slope of a segment).

■ 3.4.1 (ADP, Supporting)

The learner will be able to identify definitions, axioms and theorems, EXPLAIN the necessity for them and of and GIVE EXAMPLES of them.

■ 3.4.2 (ADP, Supporting)

The learner will be able to recognize that there are geometries, other than Euclidean geometry, in which the parallel postulate is not true.

■ 3.4.3 (Supporting)

The learner will be able to be ABLE TO perform constructions such as a line parallel to a given line through a point not on the line, the perpendicular bisector of a line and the bisector of an angle.

■ 5.2.1 (DOK 1) ASSESSED

The learner will be able to apply order of operations, real number properties (identity, inverse, commutative, associative, distributive, closure) and rules of exponents (integer) to simplify algebraic expressions.

Data Analysis and Probability (15%)

■ 4.1.3 (Supporting)

The learner will be able to represent real-world data USING matrices and will USE matrix addition, subtraction, multiplication (with matrices no larger than 2×2) and scalar multiplication to solve real-world problems.

■ 4.4.1 (DOK 3) ASSESSED

The learner will be able to determine theoretical and experimental (from given data) probabilities; MAKE PREDICTIONS and DRAW INFERENCES from probabilities; COMPARE theoretical and experimental probabilities and DETERMINE probabilities involving replacement and non-replacement.

Algebraic Thinking (35%)

■ 5.1.5 (DOK 2) ASSESSED

The learner will be able to determine if a relation is a function; DETERMINE the domain and range of a function (linear and quadratic); DETERMINE the slope and intercepts of a linear function; DETERMINE the maximum, minimum, and intercepts (roots/zeros) of a quadratic function and EVALUATE a function written in function notation for a specified rational number.