

Integrated 3 Mathematics Priority Standards

Integrated 3: Generalizations

A central theme in Integrated 3 is generalizations. Students study number systems and evaluate algebraic equations. The study of geometry extends to three-dimensional figures and the effects of changes in attributes of one of the dimensions. The study of functions is extended.

M3.1 Core Content: Solving problems

- M3.1.A Select and justify functions and equations to model and solve problems.
- M3.1.B Solve problems that can be represented by systems of equations and inequalities.
- M3.1.C Solve problems that can be represented by quadratic functions, equations, and inequalities.
- M3.1.D Solve problems that can be represented by exponential and logarithmic functions and equations.
- M3.1.E Solve problems that can be represented by inverse variations of the forms $f(x) = ax + b$, $f(x) = ax^2 + b$, and $f(x) = a(bx + c)$

M3.2 Core Content: Transformations and functions (Algebra, Geometry/Measurement)

- M3.2.A Sketch results of transformations and compositions of transformations for a given two-dimensional figure on the coordinate plane, and describe the rule(s) for performing translations or for performing reflections about the coordinate axes or the line $y = x$.
- M3.2.B Determine and apply properties of transformations.
- M3.2.C Given two congruent or similar figures in a coordinate plane, describe a composition of translations, reflections, rotations, and dilations that superimposes one figure on the other.
- M3.2.D Describe the symmetries of two-dimensional figures and describe transformations, including reflections across a line and rotations about a point.
- M3.2.E Construct new functions using the transformations $f(x - h)$, $f(x) + k$, $cf(x)$, and by adding and subtracting functions, and describe the effect on the original graph(s).

M3.3 Core Content: Functions and modeling (Algebra)

- M3.3.A Know and use basic properties of exponential and logarithmic functions and the inverse relationship between them.
- M3.3.B Graph an exponential function of the form $f(x) = ab^x$ and its inverse logarithmic function.
- M3.3.C Solve exponential and logarithmic equations.
- M3.3.D Plot points, sketch, and describe the graphs of functions of the form $f(x) = a \cdot x - c + d$, and solve related equations.
- M3.3.E Plot points, sketch, and describe the graphs of functions of the form $f(x) = ax + b$, $f(x) = ax^2 + b$, and $f(x) = a(bx + c)$, and solve related equations.
- M3.3.F Plot points, sketch, and describe the graphs of cubic polynomial functions of the form $f(x) = ax^3 + d$ as an example of higher order polynomials and solve related equations.
- M3.3.G Solve systems of three equations with three variables.

M3.4 Core Content: Quantifying variability (Data/Statistics/Probability)

- M3.4.A Calculate and interpret measures of variability and standard deviation and use these measures and the characteristics of the normal distribution to describe and compare data sets.
- M3.4.B Calculate and interpret margin of error and confidence intervals for population proportions.

Integrated 3 Mathematics Priority Standards

M3.5 Core Content: Three - dimensional geometry (Geometry/Measurement)

- M3.5.A Describe the intersections of lines in the plane and in space, of lines and planes, and of planes in space.
- M3.5.B Describe prisms, pyramids, parallelepipeds, tetrahedra, and regular polyhedra in terms of their faces, edges, vertices, and properties.
- M3.5.C Analyze cross-sections of cubes, prisms, pyramids, and spheres and identify the resulting shapes.
- M3.5.D Apply formulas for surface area and volume of three-dimensional figures to solve problems.
- M3.5.E Predict and verify the effect that changing one, two, or three linear dimensions has on perimeter, area, volume, or surface area of two and three-dimensional figures.
- M3.5.F Analyze distance and angle measures on a sphere and apply these measurements to the geometry of the earth.

M3.6 Core Content: Algebraic properties (Numbers, Algebra)

- M3.6.A Explain how whole, integer, rational, real, and complex numbers are related, and identify the number system(s) within which a given algebraic equation can be solved.
- M3.6.B Use the laws of exponents to simplify and evaluate numeric and algebraic expressions that contain rational exponents.
- M3.6.C Add, subtract, multiply, and divide polynomials.
- M3.6.D Add, subtract, multiply, divide, and simplify rational and more general algebraic expressions.

M.3.7 Additional Key Content (Geometry/Measurement)

- M3.7.A Know, prove, and apply basic theorems relating circles to tangents, chords, radii, secants, and inscribed angles.
- M3.7.B Determine the equation of a circle that is described geometrically in the coordinate plane and, given equations for a circle and a line, determine the coordinates of their intersection(s).
- M3.7.C Explain and perform constructions related to the circle.
- M3.7.D Derive and apply formulas for arc length and area of a sector of a circle.

M.3.8 Core Processes: Reasoning, problem solving and communication

- M3.8.A Analyze a problem situation and represent it mathematically.
- M3.8.B Select and apply strategies to solve problems.
- M3.8.C Evaluate a solution for reasonableness, verify its accuracy, and interpret the solution in the context of the original problem.
- M3.8.D Generalize a solution strategy for a single problem to a class of related problems and apply a strategy for a class of related problems to solve specific problems.
- M3.8.E Read and interpret diagrams, graphs, and text containing the symbols, language, and conventions of mathematics.
- M3.8.F Summarize mathematical ideas with precision and efficiency for a given audience and purpose.
- M3.8.G Use inductive reasoning and the properties of numbers to make conjectures, and use deductive reasoning to prove or disprove conjectures.
- M3.8.H Synthesize information to draw conclusions and evaluate the arguments and conclusions of others.