MATH

GRADUATION PROFICIENCIES AND PERFORMANCE INDICATORS FOR RHODE ISLAND

Proficiency #1: Mathematical Reasoning and Communication

Proficiency #2: Modeling

Proficiency #3: Number and Quantity

Proficiency #4: Functions and Algebraic Reasoning

Proficiency #5: Geometry and Measurement

Proficiency #6: Data, Statistics and Probability

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**GRADUATION PROFICIENCIES
AND PERFORMANCE INDICATORS**

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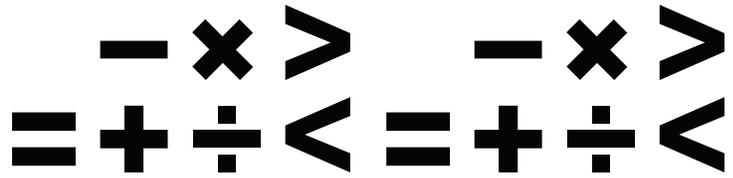
GRADUATION PROFICIENCY #1:

MATHEMATICAL REASONING AND COMMUNICATION

Students will reason mathematically to solve problems and communicate with others.

Proficiency #1: Mathematical Reasoning and Communication

Proficiency #2: Modeling

Proficiency #3: Number and Quantity

Proficiency #4: Functions and Algebraic Reasoning

Proficiency #5: Geometry and Measurement

Proficiency #6: Data, Statistics and Probability

PERFORMANCE INDICATORS:
Students will...

	K-2	3-5	6-8	9-12
A	Observe, identify and analyze situations in order to ask questions and understand and describe problems. (MP1, 2)	Observe, identify and analyze situations in order to ask questions and understand and describe problems. (MP1,2)	Observe, identify and analyze situations in order to ask questions and understand and describe problems. (MP1, 2)	Observe, identify and analyze situations in order to ask questions and understand and describe problems. (MP1, 2)
B	Select strategies and appropriate tools to develop and implement a plan to solve problems. (MP1, 5)	Select strategies and appropriate tools to develop and implement a plan to solve problems. (MP1, 5)	Select strategies and appropriate tools to develop and implement a plan to solve problems. (MP1, 5)	Select strategies and appropriate tools to develop and implement a plan to solve problems. (MP1, 5)
C	Explain whether an answer is mathematically and contextually reasonable. (MP1, 6)	Explain whether an answer is mathematically and contextually reasonable. (MP1, 6)	Explain whether an answer is mathematically and contextually reasonable. (MP1, 6)	Explain whether an answer is mathematically and contextually reasonable. (MP1, 6)
D	Evaluate, justify, and defend the relative effectiveness of problem solving processes using logical argument. (MP1, 3)	Evaluate, justify, and defend the relative effectiveness of problem solving processes using logical argument. (MP 1, 3)	Evaluate, justify, and defend the relative effectiveness of problem solving processes using logical argument. (MP 1, 3)	Evaluate, justify, and defend the relative effectiveness of problem solving processes using logical argument. (MP1, 3)

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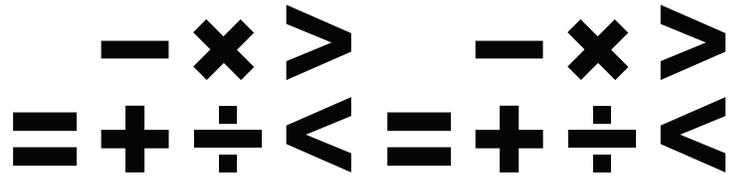
GRADUATION PROFICIENCY #1:

MATHEMATICAL REASONING
AND COMMUNICATION
(CONTINUED)

	K-2	3-5	6-8	9-12
E	Precisely communicate mathematical understandings and connections using a variety of representations. (MP1, 3, 6)	Precisely communicate mathematical understandings and connections using a variety of representations. (MP1, 3, 6)	Precisely communicate mathematical understandings and connections using a variety of representations. (MP1, 3, 6)	Precisely communicate mathematical understandings and connections using a variety of representations. (MP1, 3, 6)

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**GRADUATION PROFICIENCIES
AND PERFORMANCE INDICATORS**

GRADUATION PROFICIENCY #2:

MODELING

Students will choose the appropriate mathematics to describe, understand and analyze real world situations.

Proficiency #1: Mathematical Reasoning and Communication

Proficiency #2: Modeling

Proficiency #3: Number and Quantity

Proficiency #4: Functions and Algebraic Reasoning

Proficiency #5: Geometry and Measurement

Proficiency #6: Data, Statistics and Probability

PERFORMANCE INDICATORS:
Students will...

	K-2	3-5	6-8	9-12
A	Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real world situation. (MP4)	Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real world situation. (MP4)	Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real world situation. (MP4)	Create an appropriate model using numbers, quantities, and other representations to describe a relationship in a real world situation. (MP4)
B	Compare and critique different models for a real world situation. (MP4)	Compare and critique different models for a real world situation. (MP4)	Compare and critique different models for a real world situation. (MP4)	Compare and critique different models for a real world situation. (MP4)
C	Apply models to real world situations. (MP4)	Apply models to real world situations. (MP4)	Apply models to real world situations. (MP4)	Apply models to real world situations. (MP4)
D	Interpret the results of a mathematical model in the context of the original real world situation. (MP4)	Interpret the results of a mathematical model in the context of the original real world situation. (MP4)	Interpret the results of a mathematical model in the context of the original real world situation and adjust the model as needed. (MP4)	Interpret the results of a mathematical model in the context of the original real world situation and adjust the model as needed. (MP4)

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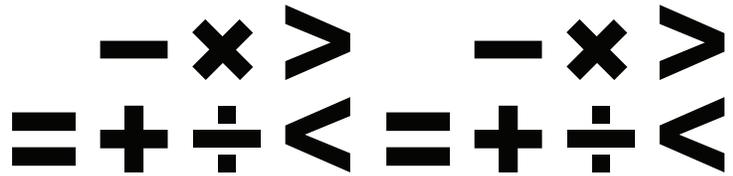
GRADUATION PROFICIENCY #3:

NUMBER AND QUANTITY

Students will reason, describe, and analyze quantitatively using number and units to solve problems.

Proficiency #1: Mathematical Reasoning and Communication

Proficiency #2: Modeling

Proficiency #3: Number and Quantity

Proficiency #4: Functions and Algebraic Reasoning

Proficiency #5: Geometry and Measurement

Proficiency #6: Data, Statistics and Probability

PERFORMANCE INDICATORS:
Students will...

	K-2	3-5	6-8	9-12
A	Use counting to identify quantities. (K.CC.1, 2, 4, 5, 6; 1.NBT.1; 2.OA.3; 2.NBT.2)	Explain and make generalizations about the patterns in the place value system. (4.NBT.1, 2; 5.NBT.1, 2, 3)	Compute fluently with multi-digit numbers and find common factors and multiples. (6.NS.2, 3, 4)	Reason quantitatively and use units to solve problems. (HS.N-Q.A)
B	Explain and make generalizations about the patterns in the place value system. (K.NBT.1; 1.NBT.2, 3; 2.NBT.1, 2, 3, 4)	Perform single- and multi-digit arithmetic with the four operations with whole numbers and decimals using understanding of place value and the properties of operations. (3.OA.1, 2, 5, 7; 3.NBT.1, 2, 3; 4.NBT.4, 5, 6; 5.OA.1; 5.NBT.4, 5, 6, 7)	Make and explain statements of order and comparison of rational numbers. (6.NS.5, 6, 7)	Perform arithmetic operations and solve equations involving complex numbers. (HS.N-CN.A.1,2; HS.N-CN.C.7)

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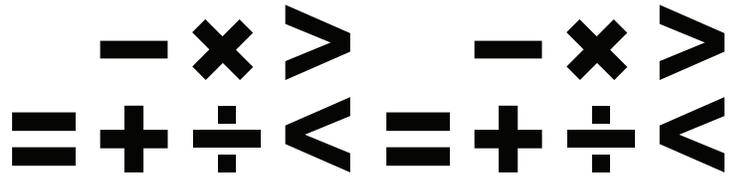
GRADUATION PROFICIENCY #3:

NUMBER AND QUANTITY
(CONTINUED)

		K-2	3-5	6-8	9-12
C		Perform single- and multi-digit addition and subtraction with whole numbers using understanding of place value and the properties of operations. (K.OA.2, 5; 1.OA.5, 6, 8; 1.NBT.4, 5, 6; 2.OA.2; 2.NBT.5, 6, 7, 8, 9)	Solve problems involving measurement concepts using all four operations. (3.MD.1; 4.MD.1, 2; 5.MD.1)	Solve real world and mathematical problems involving the four operations with rational numbers. (6.NS.1; 7.NS.1, 2, 3; 7.EE.3)	
D		Solve problems with addition and subtraction involving measurement concepts. (K.MD.2 ; 1.MD.A.3; 2.MD.5, 6, 7, 8)	Solve fraction problems with all four operations by applying understanding of fraction as number, the concept of equivalency, and previous understanding of operations on whole numbers. (3.NF.1, 2, 3; 3.G.2; 4.NF.1, 2, 3, 4, 5; 5.NF.1, 2, 3, 4, 5, 6, 7)	Identify irrational numbers and approximate them with rational numbers. (8.NS.1, 2; 8.EE.2)	

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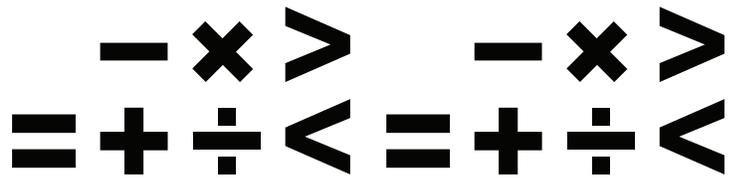
GRADUATION PROFICIENCY #4:

FUNCTIONS & ALGEBRAIC REASONING

Students will create, interpret, use, and analyze expressions, equations and inequalities including recognizing when a relationship is a function and evaluating that function.

Proficiency #1: Mathematical Reasoning and Communication

Proficiency #2: Modeling

Proficiency #3: Number and Quantity

Proficiency #4: Functions and Algebraic Reasoning

Proficiency #5: Geometry and Measurement

Proficiency #6: Data, Statistics and Probability

PERFORMANCE INDICATORS:
Students will...

	K-2	3-5	6-8	9-12
A	Represent and solve problems (of all problem types) using the relationship between addition and subtraction. (K.OA.1, 2, 3, 4; 1.OA.1, 2, 4, 8; 2.OA.1)	Represent and solve problems (of all problem types) involving all four operations using the relationship between addition/subtraction and multiplication/division. (3.OA.3, 4, 6, 8; 4.OA.1, 2, 3)	Use properties to create and evaluate equivalent expressions. (6.EE.1, 2, 3, 4; 7.EE.1, 2; 8.EE.1, 2, 4)	Interpret the structure of expressions and use it to solve problems. (HS.A-SSE.A, B; HS.A-APR.A, D.6)
B	Apply the concept of equality and properties of operations to solve problems. (1.OA.3, 7, 8)	Apply the concept of equality and the properties of operations to solve problems.* (3.OA.4, 5)	Create and solve equations and inequalities in mathematical and real world problems. (6.EE.5-9; 7.EE.4)	Solve equations, systems, and inequalities symbolically and graphically. (HS.A-REI.B, C, D)
C	Observe and identify patterns and relationships. (K.CC.1, 2, 3; K.NBT.1; 1.NBT.1, 2, 3; 2.OA.3; 2.NBT.1, 2, 3, 4)	Generate, analyze, and explain numerical patterns and relationships. (3.OA.9; 4.OA.4, 5; 5.OA.3; 5.NBT.2)	Analyze proportional relationships and use them to solve real world and mathematical problems. (6.RP.1, 2, 3; 7.RP.1, 2, 3; 7.G.1; 8.EE.5)	Use multiple representations to analyze and interpret functions in terms of their context. (HS.F-IF.B, C7)

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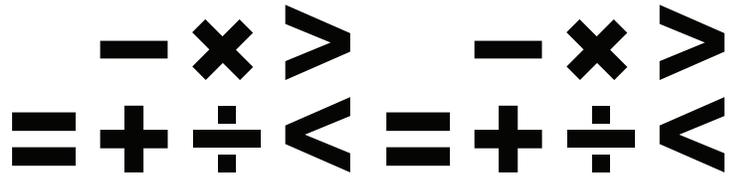
GRADUATION PROFICIENCY #4:

FUNCTIONS & ALGEBRAIC REASONING
(CONTINUED)

	K-2	3-5	6-8	9-12
D			Analyze, graph and solve linear equations and pairs of simultaneous linear equations to solve problems. (6.EE.9; 8.EE.7, 8)	Build functions to model relationships between quantities. (HS.F-BF.A; HS.F-LE.A, B)
E			Identify and compare functions.(8.F.1, 2, 3)	
F			Use functions to model relationships between two quantities. (8.F.4, 5)	
G				

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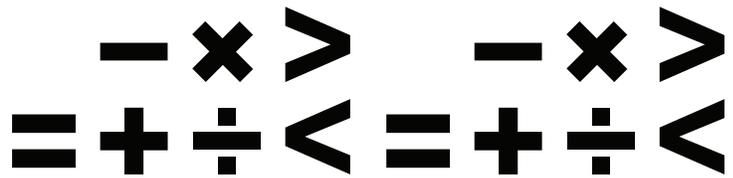
GRADUATION PROFICIENCY #5:

GEOMETRY AND MEASUREMENT

Students will apply concepts of geometry, spatial reasoning, and measurement in the context of real world problems.

Proficiency #1: Mathematical Reasoning and Communication

Proficiency #2: Modeling

Proficiency #3: Number and Quantity

Proficiency #4: Functions and Algebraic Reasoning

Proficiency #5: Geometry and Measurement

Proficiency #6: Data, Statistics and Probability

PERFORMANCE INDICATORS:
Students will...

	K-2	**3-5**	**6-8**	**9-12**
A	Describe and compare measurable attributes of objects. (K.MD.1, 2; 1.MD.1)	Graph points on the coordinate plane to solve real world and mathematical problems. (5.G.1, 2)	Use transformations to demonstrate congruence and similarity. (8.G.1, 2, 3, 4)	Use transformations to define congruence and similarity. (HS.G–CO.A,B; HS.G-SRT.A)
B	Create, identify, and distinguish between shapes based on their defining attributes. (K.G.1, 2, 3, 4, 5, 6; 1.G.1, 2; 2.G.1)	Identify, distinguish, and classify 2D and 3D geometric figures based on their properties. (3.G.1; 4.G.1, 2, 3; 5.G.3, 4)	Apply the Pythagorean Theorem and its converse to solve real world and mathematical problems. (8.G.7, 8)	Demonstrate and explain proofs of geometric theorems. (HS.G-CO.C; HS.G-SRT.B.4; HS.G-GC.1)
C	Use appropriate tools to measure. (1.MD.2; 2.MD.1, 2, 3, 4)	Apply understanding of geometric measurement (angles, perimeter, area and volume) to solve real world problems. (3.MD.5, 6, 7; 4.MD.3, 5, 6, 7; 5.MD.3, 4, 5)	Apply understanding of geometric measurement (angles, length, area, surface area and volume) to solve real world problems. (6.G.1, 2, 3, 4; 7.G.4, 5, 6; 8.G.9)	Use geometric properties and theorems to solve problems. (HS.G-SRT.B.5; C; HS.G-C.A.1, 2, 3; B.5; HS.G-GPE.B.4,5,7)

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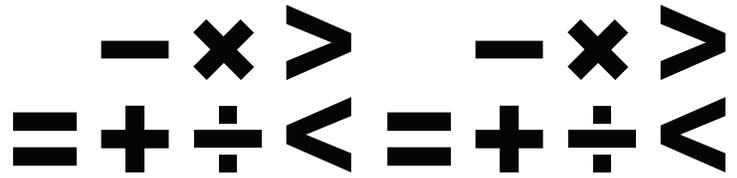
GRADUATION PROFICIENCY #5:

GEOMETRY AND MEASUREMENT
(CONTINUED)

	K-2	3-5	6-8	9-12
D				Apply coordinate geometry to solve problems. (HS.G-GPE.A.1, 2; B.6)
E				Solve problems involving two- and three-dimensional objects. (HS.G-GMD.A, B)
F				Apply trigonometric ratios to solve problems involving right triangles. (HS.G-SRT.C)

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AND PERFORMANCE INDICATORS

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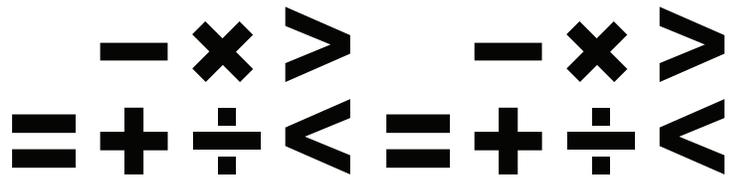
GRADUATION PROFICIENCY #6:

DATA, STATISTICS, AND PROBABILITY

Students will apply principles of statistics and probability to analyze and interpret data, reach and justify conclusions and make inferences and predictions.

Proficiency #1: Mathematical Reasoning and Communication

Proficiency #2: Modeling

Proficiency #3: Number and Quantity

Proficiency #4: Functions and Algebraic Reasoning

Proficiency #5: Geometry and Measurement

Proficiency #6: Data, Statistics and Probability

PERFORMANCE INDICATORS:
Students will...

	K-2	3-5	6-8	9-12
A	Classify, organize and represent data. (K.MD.3; 1.MD.4; 2.MD.9, 10)	Classify, organize and represent data. (3.MD.3, 4; 4.MD.4; 5.MD.2)	Organize and represent bivariate data. (6.SP.4; 8.SP.1, 2, 4)	Summarize, represent, and interpret data. (HS.S-ID.A, B, C)
B	Interpret and use information from data sets to solve problems. (1.MD.4; 2.MD.10)	Interpret and use information from data sets to solve problems. (3.MD.3; 4.MD.4; 5.MD.2)	Summarize, describe and make inferences about distributions of data. (6.SP.2, 3, 5; 7.SP.3, 4; 8.SP.1, 3, 4)	Use data to make inferences and justify conclusions from sample surveys, experiments, and observational studies. (HS.S-IC.A, B)
C			Use random sampling to draw inferences about a population. (7.SP.1, 2)	Use the concept of dependence and rules of probability to compute probabilities. (HS.S-CP.A; B.6, 7)
D			Develop, use, and evaluate probability models. (7.SP.C)	

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