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

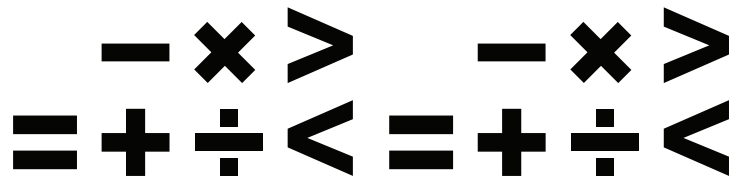**Proficiency #5:** Geometry and Measurement

Proficiency #6: Data, Statistics and Probability

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MATH

**GRADUATION PROFICIENCIES
AND PERFORMANCE INDICATORS**

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
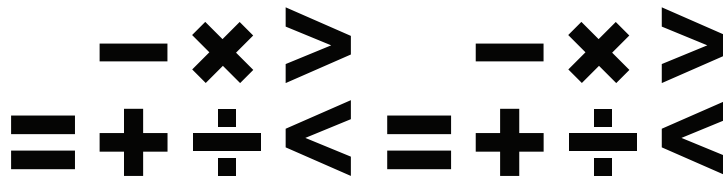
Proficiency #6: Data, Statistics and Probability

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 a problem. (MP1,5)	Select strategies and appropriate tools to develop and implement a plan to solve a problem. (MP1,5)	Select strategies and appropriate tools to develop and implement a plan to solve a problem. (MP1,5)	Select strategies and appropriate tools to develop and implement a plan to solve a problem. (MP1,5)
C	Reflect on the reasonableness of the solution to a problem. (MP1,6)	Reflect on the reasonableness of the solution to a problem. (MP1,6)	Reflect on the reasonableness of the solution to a problem. (MP1,6)	Reflect on the reasonableness of the solution to a problem. (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)

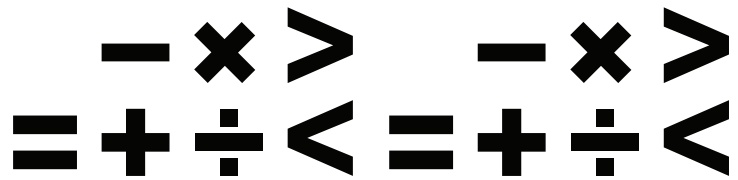**MATH GRADUATION PROFICIENCIES AND PERFORMANCE INDICATORS**
RHODE ISLAND LEARNING CHAMPIONS, LAST UPDATED DECEMBER 2017

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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)	Precisely communicate mathematical understandings and connections using a variety of representations. (MP1)	Precisely communicate mathematical understandings and connections using a variety of representations. (MP1)	Precisely communicate mathematical understandings and connections using a variety of representations. (MP1)

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MATH

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 PROFICIENCIES
AND PERFORMANCE INDICATORS**
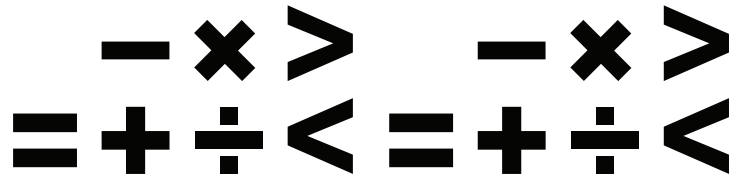
GRADUATION PROFICIENCY #3:

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
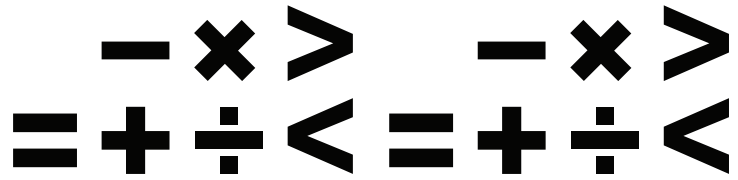
Proficiency #6: Data, Statistics and Probability

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. (6NS. 2, 3, 4)	Use properties of rational and irrational numbers and properties of exponents (including rational exponents). (HS.N–RN.A,B)
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)	Apply and extend previous understandings of the set of rational numbers, including integers. (6NS.5, 6, 7)	Reason quantitatively and use units to solve problems. (HS.N-Q.A)

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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 using all four operations involving measurement concepts. (3.MD.1; 4.MD.1, 2; 5.MD.1)	Apply and extend previous understandings of operations with rational numbers. (6.NS.1; 7NS.1, 2, 3; 7.EE.3)	Perform arithmetic operations and solve equations using complex numbers. (HS.N-CN.A.1,2; HS.N–CN.C.7)
D	Solve problems with addition and subtraction involving measurement concepts. (K.MD.2 ; 1.MD.A.3; 2.MD.5, 6, 7, 8)	Construct meaning of fractions as numbers, equate fractions to decimal notation, and apply operations using fractions based upon previous understanding of operations with whole numbers. (3.NF.1, 2, 3 ; 3.G.2; 4.NF. 1, 2, 3, 4, 5, 6, 7; 5.NF.1, 2, 3, 4, 5, 6, 7)	Identify irrational numbers and approximate them with rational numbers. (8NS.1, 2; 8.EE.2)	

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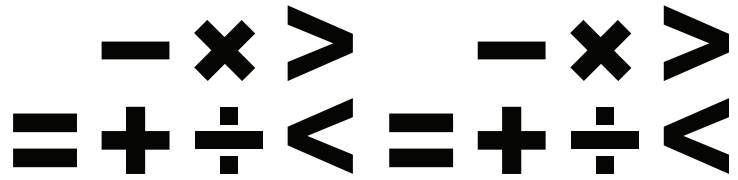
GRADUATION PROFICIENCY #4:

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
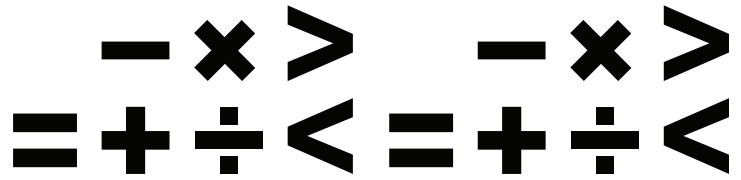
Proficiency #6: Data, Statistics and Probability

PERFORMANCE INDICATORS:
Students will...

	K-2	3-5	6-8	9-12
A	Represent and solve problems involving addition and subtraction (of all problem types). (K.OA.1, 2, 3, 4; 1.OA.1, 2; 2.OA.1)	Represent and solve problems involving all four operations (of all problem types). (3.OA.3, 8; 4.OA.1, 2, 3)	Use properties of operations to create and evaluate equivalent expressions. (6.EE.1,2, 3, 4; 7.EE.1, 2; 8.EE.1, 2, 4)	Look for, interpret, and/or make use of structure in expressions and equations. (HS.A-SSE.B; HS.A-APR.A; HS.A-APR.D.6)
B	Apply the properties of operations and equality to solve problems. (1.OA.3, 7, 8)	Apply the properties of operations and equality to solve problems. (3.OA.4)	Create and solve equations and inequalities in mathematical and real world problems. (6.EE.5, 7, 8, 9; 7.EE.4)	Analyze equations and make connections to key features of their graphs. (HS.A-REI.D.1; HS.F-IF.B.4;C.7)
C	Explain the relationship between addition and subtraction. (1.OA.4, 8)	Explain the relationship between multiplication and division. (3.OA.4, 6)	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)	Solve equations and inequalities symbolically and justify a solution method. (HS.A-REI.B)

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**GRADUATION PROFICIENCIES
AND PERFORMANCE INDICATORS**

FUNCTIONS & ALGEBRAIC REASONING
(CONTINUED)

	K-2	3-5	6-8	9-12
D	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, graph and solve linear equations and pairs of simultaneous linear equations to solve problems. (8.EE.7, 8)	Represent and solve equations and inequalities graphically. (HS.A-REI.D)
E			Identify and compare functions.(8.F.1, 2, 3)	Interpret and identify functions that arise in applications in terms of the context. (HS.F-IF.B)
F			Use functions to model relationships between two quantities. (8.F.4, 5)	Analyze functions using multiple representations. (HS.F-IF; HS.F.TF)
G				Build a function that describes a relationship between two quantities. (HS.F-BF.A)

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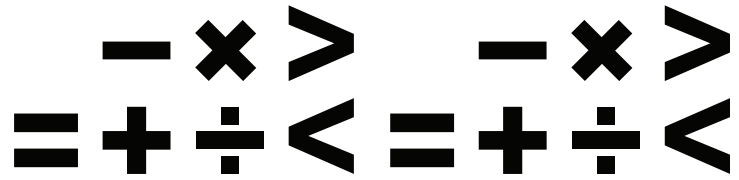
GRADUATION PROFICIENCY #5:

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. (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,D; 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)	Create, 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)	Analyze and justify the Pythagorean Theorem and its converse and apply the Pythagorean Theorem to solve problems. (8.G.6, 7, 8)	Apply congruence and similarity in terms of transformations to prove geometric theorems. (HS.G-CO.C; HS.G-SRT.B.4)
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.C.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, 6, 7, 8; HS.G-SRT.C; HS.G-C.A.1, 2, 3; B.5; HS.G-GPE.B.4, 5, 7)

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GRADUATION PROFICIENCIES AND PERFORMANCE INDICATORS

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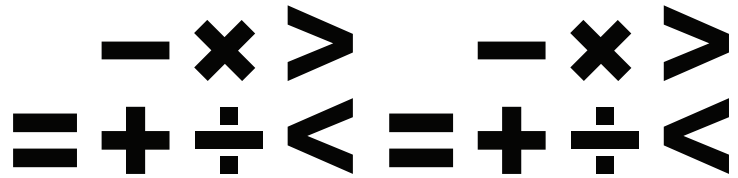
GEOMETRY AND MEASUREMENT
(CONTINUED)

	K-2	3-5	6-8	9-12
D				Apply coordinate geometry to solve problems involving segments, circles, and parabolas. (HS.G-GPE.A.1,2; B.6)
E				Apply measurement formulas to solve problems involving two- and three-dimensional objects. (HS.G-GMD.A; HS.G-GMD.B)
F				Apply right triangle trigonometry. (HS.G-SRT.C.6)

MATH GRADUATION PROFICIENCIES AND PERFORMANCE INDICATORS
RHODE ISLAND LEARNING CHAMPIONS, LAST UPDATED DECEMBER 2017

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**GRADUATION PROFICIENCIES
AND PERFORMANCE INDICATORS**
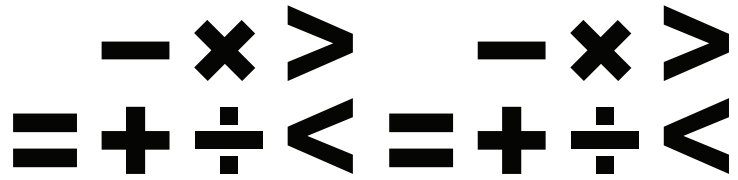
GRADUATION PROFICIENCY #6:

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 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 rules of probability to compute probabilities. (HS.S-CP.A; B.6, 7)
D			Develop, use, and evaluate probability models. (7.SP.1, 2, 3, 4)	

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