

Mathematics - Frederick County Public Schools

Graduation Competencies and Performance Standards

(Revised 3/10/20)

Mathematics Graduation Competency 1: Precision

Make sense of, persevere, and attend to precision in the solving of problems.

1A

Use a range of representations and translate those strategies, including graphs, diagrams, tables, algebraic notation, geometric figures, and data representations as needed to make sense of the problem.

1B

Express answers to problems using appropriate levels of precision that reflect the precision of the given information and calculations.

Mathematics Graduation Competency 2: Reasoning

Reason abstractly and quantitatively.

2A

Decontextualize mathematical problems.

2B

Contextualize the mathematics by relating mathematical operations back to a particular context to ensure they are making sense.

2C

Analyze quantities involved in a problem to ensure that answers are reasonable.

Mathematics Graduation Competency 3: Formal Argument

Construct viable arguments and critique the reasoning of others.

3A

Explain, orally or in writing, strategies and thinking using models, drawing, or symbolic representations.

3B

Construct and present formal mathematical arguments using verbal or written explanations for appropriate symbolic notation, models, graphs, geometric representations, and data displays in an appropriate format.

Mathematics Graduation Competency 4: Modeling

Model with mathematics and use appropriate tools strategically.

4A

Using prior mathematical knowledge, develop a mathematical representation using a range of representations while solving a problem.

4B

Select appropriate tools strategically to solve mathematical tasks/problems efficiently.

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Mathematics Graduation Competency 5: Structure

Look for and make use of structure and express regularity in repeated reasoning.

5A	Make a conclusion about the context of the situation by looking for patterns and/or structure.
5B	Use patterns and/or structure to justify a conclusion using mathematical reasoning.
5C	Make a conclusion using correct mathematical notation and terminology.
5D	Extend patterns and notice repeated calculations to create and justify general mathematical rules.

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Mathematics Graduation Competency 1:

Make sense of, persevere, and attend to precision in the solving of problems.

1A	Use a range of representations and translate those strategies, including graphs, diagrams, tables, algebraic notation, geometric figures, and data representations as needed to make sense of the problem.
1B	Express answers to problems using appropriate levels of precision that reflect the precision of the given information and calculations.

Performance Standards Scoring Criteria for Competency 1

Performance Standards	1 - Emergent	2 - Approaching	3 - Proficient	4 - Exemplary .
1A Use a range of representations and translate those strategies, including graphs, diagrams, tables, algebraic notation, geometric figures, and data representations as needed to make sense of the problem.	I can use a strategy , but cannot achieve an answer that makes sense of the problem.	I can use a strategy and achieve an answer that makes sense of the problem, but has errors.	I can use an appropriate strategy and achieve an answer that makes sense of the problem, but may have minor errors..	I can use an appropriate strategy and must achieve a correct answer that makes sense of the problem.
1B Express answers to problems using appropriate levels of precision that reflect the precision of the given information and calculations.	I can use the given information in the problem to provide an answer to the problem and/or no strategy is evident .	I can use the given information in the problem to apply a strategy and answer the problem though it may have major errors .	I can use the given information in the problem to apply an appropriate strategy and calculate the answer with only minor errors .	I can use the given information in the problem to apply an appropriate strategy and calculate the correct answer with correct math terminology .

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Mathematics Graduation Competency 2:

Reason abstractly and quantitatively.

2A	Decontextualize mathematical problems.
2B	Contextualize the mathematics by relating mathematical operations back to a particular context to ensure they are making sense.
2C	Analyze quantities involved in a problem to ensure that answers are reasonable.

Performance Standards Scoring Criteria for Competency 2

Performance Standards	1 - Emergent	2 - Approaching	3 - Proficient	4 - Exemplary
2A Decontextualize mathematical problems.	I can create a mathematical representation that makes minimal connection to the problem with major errors .	I can create a mathematical representation that connects the context of the problem to the representation.	I can create an appropriate mathematical representation that connects the context of the problem to the representation with minor errors .	I can create an appropriate mathematical representation that accurately connects the context of the problem to the representation without errors .
2B Contextualize the mathematics by relating mathematical operations back to a particular context to ensure they are making sense.	I can make a mathematical connection that is relevant but not correct .	I can make a mathematical connection that is partially correct or relevant .	I can make a mathematical connection between the solutions and the problem that is mostly correct and relevant .	I can extend the mathematical solution to create a deeper understanding of the problem that is entirely correct and relevant .
2C Analyze quantities involved in a problem to ensure that answers are reasonable.	I can analyze the incorrect quantity and correctly state whether it is reasonable.	I can analyze incorrect solution but correctly explain whether it is reasonable. or I can analyze the correct solution but explain incorrectly whether it is reasonable.	I can analyze the correct solution and correctly state whether it is reasonable.	I can analyze the correct solution and correctly explain whether it is reasonable.

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Mathematics Graduation Competency 3:

Construct viable arguments and critique the reasoning of others.

3A	Explain, orally or in writing, strategies and thinking using models, drawing, or symbolic representations.
3B	Construct and present formal mathematical arguments using verbal or written explanations for appropriate symbolic notation, models, graphs, geometric representations, and data displays in an appropriate format.

Performance Standards Scoring Criteria for Competency 3

Performance Standards	1 - Emergent	2 - Approaching	3 - Proficient	4 - Exemplary
3A Explain, orally or in writing, strategies and thinking using models, drawing, or symbolic representations.	I can explain my strategy and/or thinking.	I can accurately explain some of my strategy and/or thinking.	I can accurately explain all of my strategy and/or thinking.	I can accurately explain and justify my strategy and/or thinking. (Note: Justify means b/c - why did I do it, while explain is what I did).
3B Construct and present formal mathematical arguments using verbal or written explanations for appropriate symbolic notation, models, graphs, geometric representations, and data displays in an appropriate format.	I can construct a minimal mathematical argument to communicate my thinking.	I can construct a partial mathematical argument to communicate my thinking.	I can construct a complete and accurate mathematical argument to communicate my thinking.	I can construct a completely logical and accurate mathematical argument to precisely communicate my thinking.

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Mathematics Graduation Competency 4:

Model with mathematics and use appropriate tools strategically.

4A	Using prior mathematical knowledge, develop a mathematical representation using a range of representations while solving a problem.
4B	Select appropriate tools strategically to solve mathematical tasks/problems efficiently.

Performance Standards Scoring Criteria for Competency 4

Performance Standards	1 - Emergent	2 - Approaching	3 - Proficient	4 - Exemplary
4A Using prior mathematical knowledge, develop a mathematical representation/model using a range of representations while solving a problem.	I can develop a mathematical representation/model that is incomplete and contains errors.	I can develop a mathematical representation/model that may be incomplete and/or will not lead to a correct answer due to major errors.	I can develop an effective and precise mathematical representation/model that will lead to a correct answer, but with minor errors .	I can develop an effective and precise mathematical representation/model that will lead to a correct answer.
4B Select appropriate tools strategically to solve mathematical tasks/problems efficiently.	I can select a tool, but cannot solve the mathematical problem.	I can select an appropriate tool to solve the given mathematical problem efficiently, but with major errors.	I can select an appropriate tool to solve the given mathematical problem efficiently , but with minor errors.	I can select an appropriate tool to solve the given mathematical problem efficiently and correctly .

Mathematics Graduation Competency 5:

Look for and make use of structure and express regularity in repeated reasoning.

5A	Make a conclusion about the context of the situation by looking for patterns and/or structure.
5B	Use patterns and/or structure to justify a conclusion using mathematical reasoning.
5C	Make a conclusion using correct mathematical notation and terminology.
5D	Extend patterns and notice repeated calculations to create and justify general mathematical rules.

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Performance Standards Scoring Criteria for Competency 5				
Performance Standards	1 - Emergent	2 - Approaching	3 - Proficient	4 - Exemplary
5A Make a conclusion about the context of the situation by looking for patterns and/or structure	I can identify a conclusion about the context of a mathematical problem.	I can formulate a conclusion using the correct context of a mathematical problem.	I can formulate a conclusion about the context of a mathematical problem while exploring patterns and/or structures.	I can formulate a conclusion about the context of a mathematical problem while including patterns and/or structures.
5B Use patterns and/or structure to justify a conclusion while using mathematical reasoning.	I can identify a conclusion using patterns and/or structures.	I can justify my conclusion with patterns, structure or mathematical reasoning to solve a mathematical task/problem.	I can justify my conclusion using patterns and/or structures with mathematical reasoning to solve a mathematical task/problem.	I can justify my correct conclusion using patterns and/or structure with mathematical reasoning to solve a mathematical task/problem.
5C Make a conclusion using correct mathematical notation and terminology.	I can make a statement using the problem.	I can make a statement while using mathematical language in the problem.	I can make a conclusion using math language and/or symbolic notation in the problem.	I can make a conclusion using accurate math language and/or correct symbolic notation in the problem.
5D Extend patterns and notice repeated calculations to create and justify general mathematical rules.	I can identify patterns and/or repeated calculations within the context of the problem.	I can create mathematical rules using patterns and/or repeated calculations within the context of the problem.	I can create and justify mathematical rules using patterns and/or repeated calculations within the context of the problem.	I can correctly create and justify mathematical rules using patterns and/or repeated calculations within the context of the problem.