MTEL®-Flex Mathematics—Integration of Knowledge and Understanding (Objective 0019)

Objective 0019: Prepare an organized, developed analysis on a topic integrating knowledge from at least two of the following: number sense and operations; relations, functions, and algebra; geometry and measurement; probability, statistics, calculus, and discrete mathematics.

Objective 0019 includes the following descriptive statements:

1. Create appropriate graphs and/or diagrams, including all proper labels, to model and describe a given real-world situation.
2. Apply appropriate mathematical techniques to make a prediction or comparison regarding the situation.
3. Make a recommendation or argument based on the prediction or comparison.
4. Discuss factors that could influence the accuracy of the prediction/comparison and recommendation/argument.

MTEL®-Flex enables you to demonstrate your functional content knowledge of the MTEL Mathematics test objectives through submitting materials on a topic that you select. **You must provide an analysis that integrates knowledge from at least two areas of mathematics as indicated in the objective statement. Your analysis must address the four descriptive statements listed above.**

Your submission will be evaluated on the extent to which you demonstrate the **depth of your subject matter knowledge** of the MTEL-Flex Mathematics test objective you selected during registration.

MTEL-Flex involves answering 4 prompts and writing an analysis in which you demonstrate your knowledge of the content assessed by the test objective and further elaborated by the required descriptive statements in relation to your stated topic.

Your responses to the first 4 prompts should be **no more than 2 single-spaced pages** and your written analysis should be **no more than 3 single-spaced pages.** This instructions page does not count toward your page limits.

This template contains a Prompt Section and a Written Analysis Section. Once both sections are completed, upload the template to the Pearson ePortfolio System.

For more information about the MTEL-Flex Assessment, preparing your materials for submission, and scoring of your submission, refer to the MTEL-Flex Assessment Handbook.

Prompt Section

1. Indicate at least two mathematics topics that you have selected from within the domains identified below, one from at least two different categories (A and B, B and C, or A and C). Details about the topics are provided in the Massachusetts Mathematics Curriculum Framework – 2017.

A	• Creating Equations (A-CED) – p. 85
	• Reasoning with Equations and Inequalities (A-REI) – p. 85
	• Interpreting Functions (F-IF) – p. 89
	• Building Functions (F-BF) – p. 90
	• Linear, Quadratic, and Exponential Models (F-LE) – p. 90
B	• Similarity, Right Triangles, and Trigonometry (G-SRT) – p. 98
	• Expressing Geometric Properties with Equations (G-GPE) – p. 98
	• Modeling with Geometry (G-MG) – p. 99
C	• Interpreting Categorical and Quantitative Data (S-ID) – p. 102
	• Making Inferences and Justifying Conclusions (S-IC) – p. 102
	• Conditional Probability and the Rules of Probability (S-CP) – p. 103

[
- Linear, Quadratic, and Exponential Models
- Conditional Probability and the Rules of Probability

]

2. Indicate up to three Standards of Mathematical Practice Grades 9–12 from Appendix II (pp. 177–179) of the Massachusetts Mathematics Curriculum Framework – 2017 that are related to the mathematics topics you selected in Prompt #1.

[
- Model with mathematics.
- Attend to precision.
- Look for and express regularity in repeated reasoning.

]

3. Write a 1- to 3-sentence scenario that integrates the two mathematics topics. The scenario you describe should be one that permits you to demonstrate the depth of your mathematics subject matter knowledge.

[Using sample data that I provide on jellybean flavors, I will create models that describe the probabilities of various outcomes that occur through random sampling with replacement. These models will include exponential functions and other functions that have exponential factors. I will also present an argument for using a simple exponential function to estimate the probability of an outcome that occurs through sampling without replacement and describe factors that affect its accuracy.]

4. List sources used to prepare your submission.

[Sullivan, M., & III, M. S. (2019). Precalculus (11th ed.). Pearson Education (US). https://pearsonld.vitalsource.com/books/9780135228982

Larson R. Boswell L. & Big Ideas Learning LLC. (2015). Big Ideas Math. Algebra 2: A Common Core Curriculum. Big Ideas Learning.]

Written Analysis Section

Type your analysis (**no more than 3 pages, including the prompt**) in Arial 11-point, single-spaced font, within the brackets following the prompt. If appropriate, you may include tables, charts, graphs, or other diagrams that you have prepared by inserting them into your analysis. However, the total length of your analysis, including any graphic elements, may not exceed 3 pages. The previous pages of instructions and prompts do not count toward your page limit. Your submission cannot contain hyperlinks to any materials.

Prepare an organized, developed analysis of the scenario that you described in Prompt #3 in the Prompt Section to demonstrate the depth of your mathematics subject matter knowledge. In your analysis, make sure to do the following:

1. Create appropriate graphs and/or diagrams, including all proper labels, to model and describe a given real-world situation.

2. Apply appropriate mathematical techniques to make a prediction or comparison regarding the situation.

3. Make a recommendation or argument based on the prediction or comparison.

4. Discuss factors that could influence the accuracy of the prediction/comparison and recommendation/argument.

[Analysis text here; can go up to page 3 of 3…]