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**Math Weekly Lesson Preparation Guide**

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| **Teacher Name:** **Gabriel Preston, Cuthbert Afram, Martin Asare** | **Grade:** 11 |
| **Week of:**  September 2nd – 6th, 2024 | **Unit: Chapter 1**  **Lesson Numbers:** 7 |

*Purpose: The Weekly Lesson Preparation Guide is to provide a structure that encourages teachers to think through and internalize the daily/weekly instructional expectations.*

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| ***Planning Questions*** |  | **Lesson 1-7**  **Tuesday 9/3** | **Lesson 1-7**  **Wednesday 9/4** | **Lesson 1-7**  **Thursday 9/5** | **Lesson 1-7**  **Friday 9/6** |
| 1. Complete an initial read of the lesson plan to build an understanding of the “gist” of the lesson and the models and strategies students will use. | Transform parent functions | | | Build new functions from existing functions. | |
| 1. What is the focus of this lesson? Which specific Tennessee standards are being addressed in this lesson? | **A2.F.IF.A.1** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship  **A2.F.BF.B.3** identify the effect on the graph of replacing  𝑓(𝑥) by 𝑓(𝑥)+𝑘, 𝑘𝑓(𝑥), 𝑓(𝑘𝑥), and 𝑓(𝑥+𝑘) for specific  values of 𝑘 (both positive and negative); find the value of 𝑘 given  the graphs.  **A2.N.Q.A.1** Use units as a way to understand real-world problems.  Choose and interpret the scale and the origin in graphs and data displays | | | **A2.F.IF.A.1** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship  **A2.F.BF.B.3** identify the effect on the graph of replacing  𝑓(𝑥) by 𝑓(𝑥)+𝑘, 𝑘𝑓(𝑥), 𝑓(𝑘𝑥), and 𝑓(𝑥+𝑘) for specific  values of 𝑘 (both positive and negative); find the value of 𝑘 given  the graphs.  **A2.N.Q.A.1** Use units as a way to understand real-world problems.  Choose and interpret the scale and the origin in graphs and data displays | |
| 1. How will this learning prepare students for success on the unit assessment(s)? | This section focuses on applying translations and dilations to the graphs of functions. | | | This section focuses on using transformations to write equations from graphs. | |
| 1. What is the purpose of this lesson? How does it coherently connect to previous lessons and build to future ones? | Graphing a linear equation helps students visually understand the relationship between variables. It shows how one variable changes in response to another, revealing patterns such as the slope and intercept. This visual representation makes it easier to comprehend abstract algebraic concepts.  Before graphing, students typically learn about solving linear equations algebraically. Graphing builds on this by adding a visual dimension, reinforcing the understanding of solutions. | | | When graphing linear inequalities, students can see the range of possible solutions (the shaded region), which deepens their understanding of inequalities and solutions that satisfy given conditions.  Graphing multiple linear equations or inequalities lays the groundwork for solving systems by finding intersections or overlapping regions, which will be explored in greater depth in later lessons.  **Advanced Functions:** As students move on to more complex functions (quadratic, exponential, etc.), their understanding of graphing linear functions will provide a basis for understanding these more complicated graphs. | |
| 1. How will this learning contribute to deep understanding of the essential ideas of the unit? | Graphing allows students to visually see how changes in the equation (e.g., slope and y-intercept) affect the graph. This helps in understanding the concept of the slope as a rate of change and the y-intercept as the starting value.  Graphing inequalities teaches students how to represent solutions graphically. The shaded region on a graph represents all the possible solutions to the inequality, helping students understand the concept of a solution set | | |  Graphing allows you to see how special functions behave over different domains. For example, seeing the asymptotes, intercepts, and general shape of a rational function helps in understanding its long-term behavior and critical points.  Graphs make it easier to understand how functions change under transformations, such as translations, reflections, stretches, and compressions. Visualizing these transformations deepens comprehension of how functions are manipulated.  By graphing, you can more easily identify key features of special functions, like maxima, minima, points of inflection, and intervals of increase or decrease. These features are essential for understanding the function's overall behavior and applications. | |
| 1. Complete all tasks included in the lesson and review the sample/anticipated student responses.   For each task consider:   * What are the multiple solution paths students might take to solve this problem? * What is the purpose of this task? Specifically, which aspect(s) of rigor are being addressed (conceptual understanding, procedural fluency, and/or application)? How does this differ based on the solution path * Given this purpose, what key concepts and vocabulary might students need to understand to access the task? (Consider concepts and vocabulary from the prior grade that might need to be re- addressed) | Students will work together on activities displayed on the smart board from the Reveal Lessons identifying domain, range and analyzing the graph of functions. (CFU)  Students will work examples analyzing and identifying functions graphically, determining if they are one-to-one from both tables and graph  Students will identify functions that are discreet and continuously explain why from problems on the smartboard  Students will use the structure of set- builder and interval notation to write the domain and range of functions that are both continuous and discontinuous | | | Students will look at samples of different graphs, discuss with a partner and determine if the graph is symmetric and the type of symmetry.  Students will practice identifying types of symmetry, odd/even functions by looking at the graph as well as algebraically,  Students will review the definition of linear then students will use stated assumptions and definitions to classify functions as linear or nonlinear. Upon completion students will explain how the intercepts of a graph correspond to its graph or table. (Problems displayed on board, students will discuss with a partner/small group) | |
| 1. What evidence of student learning will you look for to reveal understanding of the grade-level standard(s)? (refer to the [Instructional Focus Document](https://scsk12.sharepoint.com/:b:/s/CIMathLinks/EYpqxmc9g99Ok0WoLv0Xk-IBoDr700BY_sWN5u2zqSEUdA?e=lzzd50) Evidence of Learning Statements) | Identification of all evident key features when provided a table, graph or information imbedded in a real-world problem and be able to interpret their meaning.  Graph the function, identify key features of the graph, and interpret the meaning of the key features in  relationship to the context of the problem,  Create a real-world context that would generate a function with the provided attributes, given key features | | | Identification of all evident key features when provided a table, graph or information imbedded in a real-world problem and be able to interpret their meaning.  Graph the function, identify key features of the graph, and interpret the meaning of the key features in  relationship to the context of the problem,  Create a real-world context that would generate a function with the provided attributes, given key features | |
| 1. What are the mathematical learning and performance goals of this lesson? | Learning goal is to be able to determine the following key features:  1 to 1 function, domain, range, continuity and displaying in interval and set builders notation | | | Learning goal is for students to be able to determine the linearity, intercepts and symmetry of a function. | |
| 1. In what ways will students use the Standards for Mathematical Practice to develop mathematical understandings? | Completing the lessons students will be able to make sense of the problem after understanding the key features in turn being able to look for and make use of structures. They should be able to compare functions and construct viable arguments and model a real-world situation with mathematics. | | | Completing the lessons students will be able to make sense of the problem after understanding the key features in turn being able to look for and make use of structures. They should be able to compare functions and construct viable arguments and model a real-world situation with mathematics. | |
| 1. What supports will you build into the lesson to ensure all students have the opportunity to experience success in this grade level work? How can you ensure all students will have access to grade level opportunities in the lesson? (refer to the [Instructional Focus Document's](https://scsk12.sharepoint.com/:b:/s/CIMathLinks/EYpqxmc9g99Ok0WoLv0Xk-IBoDr700BY_sWN5u2zqSEUdA?e=lzzd50) Instructional Focus Statements) | Lesson should build from student’s algebra 1 knowledge of functions.  practice on the x and y axis and understanding of the coordinate plane.  Students will be given coordinate plane practice work, teacher will review all vocabulary prior to the lessons and teacher will demonstrate each step and the expected outcomes of the lesson for the students. | | | Lesson should build from student’s algebra 1 knowledge of functions.  practice on the x and y axis and understanding of the coordinate plane.  Students will be given coordinate plane practice work, teacher will review all vocabulary prior to the lessons and teacher will demonstrate each step and the expected outcomes of the lesson for the students. | |
| 1. Where might your students struggle? What mathematical mistakes or misconceptions do you anticipate? | Students may struggle with understanding the vocabulary, students may still misunderstand the difference between the domain and range values when looking at the graph of a functions. Most of these mistakes come from switching the coordinates for the x and y. | | | Students may struggle with understanding the vocabulary, students may still misunderstand the difference between the domain and range values when looking at the graph of a functions. Most of these mistakes come from switching the coordinates for the x and y. | |
| 1. What skills/concepts and/or mathematical vocabulary may need reinforcement? | There will need to be reinforcement of domain and range values (especially in respect to input and output values) understanding sets and how to write in multiple notations.  Understanding functions | | | There will need to be reinforcement of domain and range values (especially in respect to input and output values) understanding sets and how to write in multiple notations.  Understanding functions | |
| 1. What probing questions might you ask to encourage perseverance or push students to new understanding? | How can analyzing a function help you understand the situation it models? | | | How can analyzing a function help you understand the situation it models? | |
| 1. What questions might you ask to elicit prior content knowledge, connect to students’ experiences, and set up the task to ensure students understand the task without over-scaffolding or funneling? | What is the coordinate plane?  How do you graph on the coordinate plane/  How can you identify the domain and range and what do they represent?  What is the difference between a relation and a function? | | | What is the coordinate plane?  How do you graph on the coordinate plane/  How can you identify the domain and range and what do they represent?  What is the difference between a relation and a function? | |
| 1. How might you strategically group or partner students during discussion to support building understanding? | In most activities during the lesson students will be strategically grouped to include 2 low students, 1 middle student and 1 high student (this also depends on the dynamics of the class and how much prior knowledge each student has) | | | In most activities during the lesson students will be strategically grouped to include 2 low students, 1 middle student and 1 high student (this also depends on the dynamics of the class and how much prior knowledge each student has) | |
| 1. What questions might you ask to foster discussions around mathematical connections between anticipated student strategies? | How can you define variables to effectively model a system?  What is symmetry in terms of math/art? What makes something symmetric?  What is the most essential information/features needed to sketch a graph? | | | How can you define variables to effectively model a system?  What is symmetry in terms of math/art? What makes something symmetric?  What is the most essential information/features needed to sketch a graph? | |
| 1. How will you ensure that all students are responsible for this rigorous thinking? | Students will complete a lesson check after every few examples to determine their level of understanding of the concepts.  It may be a thumbs up/thumbs down, fist to five after each example.  Students will complete a final culminating problem at the end of the class to help assess their retention of the lesson’s concepts. | | | Students will complete a lesson check after every few examples to determine their level of understanding of the concepts.  It may be a thumbs up/thumbs down, fist to five after each example.  Students will complete a final culminating problem at the end of the class to help assess their retention of the lesson’s concepts. | |
| 1. What will you have in your hands as you are teaching?   What will students have in their hands? | Teacher will have dry erase marker in hands with examples of graphs, pen and clipboard to check off what students are doing during the CFU’s  Students will have the student companion, pencil, practice work, graph paper | | | Teacher will have dry erase marker in hands with examples of graphs, pen and clipboard to check off what students are doing during the CFU’s  Students will have the student companion, pencil, practice work, graph paper | |
| 1. What mathematical tools and/or concrete manipulatives will the teacher and students need? | Rulers, pencils, highlighters, student companion, graph paper, rulers | | | Rulers, pencils, highlighters, student companion, graph paper, rulers | |
| 1. What technology tools will be necessary to support mathematical understanding? | No technology is necessary besides the interactive smartboard and online book to give demonstrations of the graphing of functions expected outcomes. (students probably will not have 1 to 1 devices this early in the school year) | | | No technology is necessary besides the interactive smartboard and online book to give demonstrations of the graphing of functions expected outcomes. (students probably will not have 1 to 1 devices this early in the school year) | |
| ***Additional Considerations*** |  |
| If your lesson contains homework, how will you utilize the work? Will you need to send scaffolding notes home? Is there a strategy you can use to maximize homework? | Student homework (if assigned) is in the student companion book. Students will have scaffolded examples from taking notes in the TN Reveal Student companion. If companions are not available students will be asked to sketch and example of each of the graph characteristics that were covered in the lessons.  If students have access to the 1 to 1 device, problems will be assigned to students through the online book portal and problems will be scaffolded. Students should have Student companions/notes to use as examples as well as the online book (if assessable.) | | | Student homework (if assigned) is in the student companion book. Students will have scaffolded examples from taking notes in the TN Reveal Student companion. If companions are not available students will be asked to sketch and example of each of the graph characteristics that were covered in the lessons.  If students have access to the 1 to 1 device, problems will be assigned to students through the online book portal and problems will be scaffolded. Students should have Student companions/notes to use as examples as well as the online book (if assessable.) | |
| What additional materials do you need to prepare for this lesson? | N/A | | | N/A | |