Bartlett City School's Algebra II instructional maps are standards-based maps driven by the TN Standards and implemented using a variety of educational resources.

Algebra II builds on earlier experiences with linear equations and functions. The genre of functions expands to include polynomial, exponential, rational, and radical examples. Attention is given to inverses, composition of functions, and families of graphs. The instructional approach should provide opportunities for students to work together collaboratively and cooperatively while implementing technology as they solve routine and non-routine problems. Justifications, written and oral, should continue to be part of regular instruction.

The Tennessee State Standards will prepare students with essential knowledge and skills to compete in an increasingly global environment. These standards emphasize thinking, problem solving, and creativity through next generation assessments that go beyond multiple-choice tests to increase college and career-readiness among Tennessee students.

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

Throughout the year, students should continue to develop proficiency with the Eight Standards for Mathematical Practice:

**1. Make sense of problems and persevere in solving them.**

**2. Reason abstractly and quantitatively.**

**3. Construct viable arguments and critique the reasoning of others.**

**4. Model with mathematics.**

**5. Use appropriate tools strategically.**

**6. Attend to precision.**

**7. Look for and make use of structure.**

**8. Look for and express regularity in repeated reasoning.**

These practices should become the natural way in which students come to understand and do mathematics and integrated into daily instruction, depending on the content to be understood or on the problem to be solved.

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| **Domain** | **Content Standard/Scope & Clarifications** | | **Content & Tasks** |
| **Chapter 11: Sequences and Series**  **(Allow 3 weeks for instruction, review, and assessment)** | | | |
| A2.F.BF.A.1  Build a function that models a relationship between two quantities.  A2.F.BF.A.2  Build a function that models a relationship between two quantities.  A2.F.LE.A.1  Construct and compare linear, quadratic, and exponential models and solve problems. | * Write a function that describes a relationship between two quantities:  1. Determine an explicit expression, a recursive process, or steps for calculation from a context 2. Combine standard function types using arithmetic operations.  * Know and write arithmetic and geometric sequences with an explicit formula and use them to model situations. * Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.   For A2.F.BF.A.1  For example, given cost and revenue functions, create a profit function.  For A2.F.BF.A.1a:  Tasks have a real-world context  Tasks may involve linear functions, quadratic functions, and exponential functions. | | Section 11-1: Sequences as Functions |
| A2.F.BF.A.1  Build a function that models a relationship between two quantities.  A2.F.BF.A.2  Build a function that models a relationship between two quantities.  A2.F.LE.A.1  Construct and compare linear, quadratic,  and exponential models and solve problems. | * Write a function that describes a relationship between two quantities:  1. Determine an explicit expression, a recursive process, or steps for calculation from a context 2. Combine standard function types using arithmetic operations.  * Know and write arithmetic and geometric sequences with an explicit formula and use them to model situations. * Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.   For A2.F.BF.A.1  For example, given cost and revenue functions, create a profit function.  For A2.F.BF.A.1a:  Tasks have a real-world context  Tasks may involve linear functions, quadratic functions, and exponential functions. | | Section 11-2: Arithmetic Sequences and Series |
| A2.F.BF.A.1  Build a function that models a relationship between two quantities.  A2.F.BF.A.2  Build a function that models a relationship between two quantities.  A2.F.LE.A.1  Construct and compare linear, quadratic, and exponential models and solve problems.  A2.A.SSE.B.3  Use expressions in equivalent forms to solve problems. | * Write a function that describes a relationship between two quantities:  1. Determine an explicit expression, a recursive process, or steps for calculation from a context 2. Combine standard function types using arithmetic operations.  * Know and write arithmetic and geometric sequences with an explicit formula and use them to model situations. * Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. * Recognize a finite geometric series (when the common ratio is not 1), and know and use the sum formula to solve problems in context.   For A2.F.BF.A.1  For example, given cost and revenue functions, create a profit function.  For A2.F.BF.A.1a:  Tasks have a real-world context  Tasks may involve linear functions, quadratic functions, and exponential functions. | | Section 11-3: Geometric Sequences and Series |
| A2.F.BF.A.1  Build a function that models a relationship between two quantities.  A2.F.BF.A.2  Build a function that models a relationship between two quantities.  A2.F.LE.A.1  Construct and compare linear, quadratic, and exponential models and solve problems.  A2.A.SSE.B.3  Use expressions in equivalent forms to solve problems. | * Write a function that describes a relationship between two quantities:  1. Determine an explicit expression, a recursive process, or steps for calculation from a context 2. Combine standard function types using arithmetic operations.  * Know and write arithmetic and geometric sequences with an explicit formula and use them to model situations. * Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. * Recognize a finite geometric series (when the common ratio is not 1), and know and use the sum formula to solve problems in context   For A2.F.BF.A.1  For example, given cost and revenue functions, create a profit function.  For A2.F.BF.A.1a:  Tasks have a real-world context  Tasks may involve linear functions, quadratic functions, and exponential functions. | | Section 11-5: Recursion and Iteration |
| **Domain** | **Content Standard/Scope & Clarifications** | | **Content & Tasks** |
| **Chapter 12 – Probability and Statistics**  **(Allow 3 weeks for instruction, review, and assessment)** | | | |
| A2.S.IC.A.1  Make inferences and justify conclusions from sample surveys, experiments, and observational studies. | * Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.   For A2.S.IC.A.1  For example, in a given situation, is it more appropriate to use a sample survey, an experiment, or an observational study? Explain how randomization affects the bias in a study. | | Section 12-1: Experiments, Surveys, and Observational Studies |
| A2.S.IC.A.2  Make inferences and justify conclusions from sample surveys, experiments, and observational studies.  A2.S.ID.A.1  Summarize, represent, and interpret data on a single count or measurement variable. | * Use data from a sample survey to estimate a population mean or proportion; use a given margin of error to solve a problem in context. * Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages using the Empirical Rule. | | Section 12-2: Statistical Analysis |
| A2.S.ID.B.2  Summarize, represent, and interpret data on two categorical and quantitative variables. | * Represent data on two quantitative variables on a scatterplot and describe how the variables are related.  1. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.   For A2.S.IC.A.1  Use functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.   1. Tasks have a real-world context. 2. Tasks are limited to exponential functions with domains not in the integers. | | Chapter 12 Add-In Lesson (Not in Textbook):  Representing Data Graphically and Creating Scatterplots and Lines of Best Fit |
| A2.S.ID.A.1  Summarize, represent, and interpret data on a single count or measurement variable. | * Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages using the Empirical Rule. | | Section 12-5: The Normal Distribution |
| A2.S.CP.A.3  Understand independence and conditional probability and use them to interpret data.  A2.S.CP.A.4  Understand independence and conditional probability and use the to interpret data.  A2.S.CP.B.5  Use the rules of probability to compute probabilities of compound events in a uniform probability model. | * Know and understand the conditional probability of A given B as   P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.   * Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. * Find the conditional probability of A given B as the fraction of B’s outcomes that also belong to A and interpret the answer in terms of the model.   For A2.S.CP.A.4:  For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.  For A2.S.CP.B.5:  For example, a teacher gave two exams. 75 percent passed the first quiz and 25 percent passed both. What percent, who passed the first quiz, also passed the second quiz? | | Section 12-3: Conditional Probability |
| A2.S.CP.A.1  Understand independence and conditional probability and use them to interpret data. | * Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or”, “and”, “not”) | | Section 12-4: Probability and Probability Distributions |
| A2.S.CP.A.2  Understand independence and conditional probability and use them to interpret data.  A2.S.CP.B.6  Use the rules of probability to compute probabilities of compound events in a uniform probability model. | * Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent. * Know and apply the Addition Rule, P(A or B) =   P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.  For A2.S.CP.B.6:  For example, in a math class of 32 students, 14  are boys and 18 are girls. On a unit test 6  boys and 5 girls made an A. If a student is  chosen at random from a class, what is the  probability of choosing a girl or an A  student? | | Chapter 12 Add-In Lesson: The Rules of  Probability    Supplemental Material:  <http://condor.depaul.edu/ymendels/223/m5_p4_general_addn_multip.ppt>  <https://www.illustrativemathematics.org/HSS-CP>  [https://sites.google.com/a/chccs.k12.nc.us/ms-neill-s- page/home/cc-math-ii/unit-9-probability---rules-of-probability](https://sites.google.com/a/chccs.k12.nc.us/ms-neill-s-%20page/home/cc-math-ii/unit-9-probability---rules-of-probability)  <https://people.richland.edu/james/lecture/m170/ch05-rul.html> |
| **Domain** | **Content Standard/Scope & Clarifications** | | **Content & Tasks** |
| **Chapter 13 – Trigonometric Functions**  **(Allow 3 weeks for instruction, review, and assessment)** | | | |
| Pre-Requisite | | * Pre-requisite knowledge of the six trigonometric functions and their ratios of the lengths of the legs of a right triangle. | Section 13-1: Trigonometric Functions in Right Triangles |
| A2.F.TF.A.1  Extend the domain of trigonometric functions using the unit circle. | | * Understand and use radian measure of an angle.  1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. 2. Use the unit circle to find when is a commonly recognized angle between 0 and 2.   For A2.F.TF.A.1  Commonly recognized angles include all multiples of n/6 and n/4, where n is an integer. | Section 13-2: Angles and Angle Measure |
| A2.F.TF.A.2  Extend the domain of trigonometric functions using the unit circle.  A2.F.TF.B.3.a  Prove and apply trigonometric identities. | | * Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle. * Know and use trigonometric identities to find values of trig functions.  1. Given a point on a circle centered at the origin, recognize and use the right triangle ratio definitions of to evaluate the trigonometric functions. | Section 13-3: Trigonometric Functions of General Angles  Commonly recognized angles include all multiples of n/6 and n/4, where n is an integer. |
| A2.F.TF.B.3.b  Prove and apply trigonometric identities. | | * Know and use trigonometric identities to find values of trig functions.  1. Given the quadrant of the angle, use the identity to find given , or vice versa. | Chapter 13 Add-In Lesson (Not in the Textbook):  Proving the Pythagorean Identity  <https://learnzillion.com/lessonsets/519-prove-the-pythagorean-identity-and-use-it-to-find-trigonometric-values>  <https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/pythagorean-identity/v/pythagorean-trig-identity-from-unit-circle>  <http://www.coolmath.com/precalculus-review-calculus-intro/precalculus-trigonometry/29-the-pythagorean-identities-01>  <https://www.khanacademy.org/math/trigonometry/less-basic-trigonometry/pythagorean-identity/v/pythagorean-trig-identity-from-soh-cah-toa> |

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| **RESOURCE TOOLBOX:**  Khan Academy  <https://www.khanacademy.org/math/algebra2>  West Texas A & M Virtual Math Lab  <http://www.wtamu.edu/academic/anns/mps/math/mathlab/>  Free Kuta Worksheets:  <http://kutasoftware.com/>  COMPASS LEARNING ODYSSEY  <https://www.thelearningodyssey.com/>  TEACHER TUBE VIDEO TUTORING:  <http://www.teachertube.com/>  MATH TV VIDEO TUTORING:  [http://www.mathtv.com/videos\_by\_topic#](http://www.mathtv.com/videos_by_topic)  CONNECTED SITE:  <http://connected.mcgraw-hill.com/connected/login.do>  HOTMATH.COM <http://hotmath.com/help/bookindexes/hollidaytn212/index.html>  GLENCOE PRACTICE QUIZ: <http://glencoe.mcgraw-hill.com/sites/0078884829/sitemap.html?resource=selfcheckquizzes>  GLENCOE PRACTICE TEST: <http://glencoe.mcgraw-hill.com/sites/0078884829/sitemap.html?resource=chaptertest>  GLENCOE STANDARDIZED PRACTICE TEST: <http://glencoe.mcgraw-hill.com/sites/0078884829/sitemap.html?resource=standardizedtestpractice>  GLENCOE PERSONAL TUTOR VIDEO: <http://glencoe.mcgraw-hill.com/sites/0078884829/sitemap.html?resource=personaltutor> | **ADDITIONAL TASK RESOURCES:**  <http://map.mathshell.org/materials/tasks.php?taskid=265&subpage=apprentice>  <http://www.utdanacenter.org/k12mathbenchmarks/tasks/tasks.php>  <http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default.htm>  <http://www.dlt.ncssm.edu/algebra/HTML/09.htm>  **TECHNOLOGY-GRAPHING CALCULATORS:**  <http://www.ti-mathnspired.com>  <http://education.ti.com/educationportal/activityexchange/activity>  <http://www.internet4classrooms.com/eoc_algebra2.htm>  <http://illuminations.nctm.org/>  <http://www.stemresources.com/>  <http://cuacs8.mck.ncsu.edu/mathsampleitems/main.html>  <http://www.ilovemath.org/index.php?option=com_docman>  <http://mathbits.com/MathBits/TISection/Openpage.htm>  <http://mathbits.com/MathBits/TeacherResources/Algebra2/Algebra2.htm> |