SECONDARY MATHEMATICS II

Mathematical Practice Standards: Make sense of, communicate, connect and justify mathematical ideas to support understanding and learning across all mathematical concepts

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning

Solve Algebraic Equations (linear and exponential and quadratic)

- Rewrite and reveal aspects of expressions (SII.A.SSE.1-3)

- Create and solve equations, inequalities, and systems of equations, extending to include quadratic relationships (SII.A.CED.1, 2; A.REI.4, 7)
- Extend the number system to include complex numbers when real solutions do not exist (SII.N.RN.1-3; SII.N.CN.7, 8)

Understand, Compare, and Represent Functions

- Compare key characteristics of quadratic functions to those of linear and exponential functions. Interpret different forms of quadratic functions. Expand experience to include absolute value, step, and functions that are piecewise-defined (SII.F.IF.4, 5, 7-9; SII.F.BF.1,3)

Describe Characteristics of Functions

- Interpret and analyze quadratic functions (SII.F.IF.4-6) using different representations (SII.F.IF.7-9)
- Build a function that models a relationship between two quantities (SII.F.BF.1a). Build new functions from existing functions (SII.F.BF.30)

Prove Congruence and Similarity in terms of Geometric Transformations

- Verify properties of dilations (SII.G.SRT.1)
- Decide whether two figures are similar (SII.G.SRT.2)
- Prove geometric theorems related to congruence (SII.G.CO.9-11) and similarity and develop trigonometric ratios for sides of right triangles (SII.G.SRT.4-8)

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Mathematical Modeling

Mathematical modeling is a "process that uses mathematics to represent, analyze, make predictions or otherwise provide insight into real-world phenomena" (GAIMME, 2016). It is a conceptual priority at the high school level and is a curricular goal that is incorporated regularly. Standards that are marked with a star indicate distinct opportunities to engage with modeling in the Utah Core Standards. Modeling activities may extend across multiple standards.

The following relate to modeling in Secondary Mathematics II:

- Produce, interpret, and use expressions, equations and functions to model real-world phenomena (SII.A.SSE.1,3; SII.F.IF.4-6; SII.BF.1);
- Graph and analyze functions (SII.F.IF.4-7; SII.BF.1);
- Relate characteristics of functions to graphical key features and quantitative relationships (SII.F.IF.4,5,7); and
- Apply geometric concepts in modeling situations (SII.G.GMD.3).

"Modeling can be used to motivate curricular requirements and can highlight the importance and relevance of mathematics in answering important questions" (GAIMME, 2016)

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