Algebra 2-Equivalent Courses and the ACT/SAT

INTRODUCTION

More university systems are moving away from using standardized tests, such as the ACT/SAT, in admissions as there has been growing research indicating measures other than the ACT/SAT, such as grade-point average, are better predictors of student success in postsecondary institutions (Morrison, 2020). This move away from standardized testing and placement has been accelerated since the COVID-19 pandemic. Although there is movement in this direction, the Ohio Department of Education realizes the ACT and SAT still are factors for many students. This guide can help educators, parents and students navigate the ACT and SAT test blueprints and standards for Algebra 2-equivalency courses.

Equivalency to Algebra 2 is defined in terms of rigor not content. All the new math pathways courses promote critical thinking and analysis needed for standardized testing such as the ACT and SAT. No single course, not even Algebra 2, incorporates all tested standards. It is recommended ACT and SAT prep occur naturally in conversations throughout the lessons reviewing application of previously learned content. Analyzing the ACT College and Career Readiness Standards and ACT Blueprint and SAT Blueprint, students who have been successful in Algebra and Geometry should be able to get a remediation-free score in mathematics (ACT of 22, SAT of 530, Accuplacer NextGen 263). Students aiming for top scores on standardized tests such as the ACT and SAT will need exposure to a variety of courses, including Algebra 2 and an equivalent course that covers advanced statistics concepts. See the individual test blueprints for more information.

DETAILS ABOUT INDIVIDUAL COURSES

Advanced Quantitative Reasoning. Ohio's Quantitative Reasoning course, titled Mathematical Modeling and Reasoning, is equivalent to a traditional Algebra 2 course that prepares students for college and careers in the areas of critical thinking and mathematical reasoning. This course more closely aligns with the ACT than the other new math pathways courses. This is because this course was designed to help students obtain a remediation-free score in mathematics. The Quantitative Reasoning workgroup looked closely at the ACT and Accuplacer Nextgen QAS blueprints when designing the course. Although this course does not cover all the ACT standards associated with Algebra 2 (such as those associated with complex numbers), it covers a variety of other ACT standards not associated with Algebra 2 (such as the statistics standards). Additionally, this course could help students with modeling questions on the ACT, which are at least 27% of total test items. For more information, see the Mathematical Modeling and Reasoning and ACT alignment document (link coming soon). Please note most tested topics on the ACT and SAT are introduced in middle school math courses, Algebra I and Geometry. A significantly smaller portion of tested items comes from higher-level math courses.

Ohio's Mathematical Modeling and Reasoning course was not intentionally aligned with the SAT. There may be some gaps when it comes to the Passport to Advanced Mathematics section, but students should gain ground in the Statistics and Probability section.

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Statistics and Probability. Ohio's Statistics and Probability course is equivalent to a traditional Algebra 2 course that prepares students for college and careers in the areas of critical thinking and mathematical reasoning. While Statistics and Probability may not address the same math content standards as Algebra 2, this course supports learners in developing and applying their knowledge of statistics and probability concepts to real-life scenarios. The Statistics and Probability course will address numerous standards that appear on the ACT blueprint but are not included in a traditional Algebra 2/Math 3 course. The belief of the Statistics and Probability Workgroup is that any Algebra 2 content lost because a student does not take Algebra 2 can be balanced by the statistics content eligible to appear on the ACT or SAT that the students will get from their instruction in a Statistics and Probability high school pathway. (Note: The SAT Problem-Solving and Data Analysis is 29% of the test and the Passport to Advanced Mathematics, which includes both Algebra 1 and Algebra 2 concepts, is 28% of the test.) Statistics and Probability and Algebra 2 courses target some, but not all mathematics topics typically tested on the ACT and SAT. However, both courses provide opportunities for students to deepen their critical-thinking skills, which are essential in content acquisition. Logarithmic and exponential functions, if needed, can be logically added to the course as it pertains to linearizing data. Please note most tested topics on the ACT and SAT are introduced in middle school math courses, Algebra 1 and Geometry. A significantly smaller portion of tested items comes from higher-level math courses.

The Statistics and Probability course allows for flexibility in the scope and sequence. The Statistics and Probability Workgroup recommends students and teachers supplement their coursework with appropriate ACT and SAT preparation materials, especially the content not included in the Statistics and Probability course (listed above). For students wanting top scores on the ACT and SAT, here is a list of mathematical content to be reviewed that is not explicitly taught in the Statistics and Probability course:

ACT
- Operations with complex numbers;
- Properties of rational exponents;
- Trigonometric functions, including the unit circle and their graphs;
- Properties of logarithms (and their relationship to exponential expressions);
- Domain and range of polynomial and rational functions, including an understanding of asymptotes;
- Remainder Theorem for polynomials;
- Absolute value equations and inequalities.

SAT
- Simplifying rational expressions and solving simple rational equations;
- Properties of rational exponents;
- Solving simple radical equations;
- Trigonometric functions including the unit circle and their graphs;
- Operations with complex numbers;
- Absolute value equations.

Data Science Foundations. Ohio's Data Science Foundations course is equivalent to a traditional Algebra 2 course that prepares students for college and careers in the areas of critical thinking and mathematical reasoning. While Data Science Foundations may not address the same math content standards as Algebra 2, this course supports learners in developing and applying their knowledge of data science concepts to real-life scenarios. Data Science Foundations and Algebra 2 courses target some, but not all mathematics topics typically tested on the ACT and SAT. However, both courses provide opportunities for students to deepen their critical-thinking skills, which are essential in content acquisition. Please note most tested topics on the ACT and SAT are introduced in middle school math courses, Algebra 1 and Geometry. A significantly smaller portion of tested items comes from higher-level math courses.

The Data Science Foundations course will address numerous standards that appear on the ACT blueprint but are not included in a traditional Algebra 2/Math 3 course. The belief of the Data Science Foundations Workgroup is that any Algebra 2 and/or Trigonometry content lost because a student does not take those courses can be balanced by the statistics content eligible to appear on the ACT that the students will be getting from their instruction in a Data Science Foundations high school pathway.

The Data Science Foundations course allows for flexibility in the scope and sequence. The Data Science Foundations Workgroup recommends students and teachers supplement their coursework with appropriate ACT and SAT preparation materials, especially the content not included in the Data Science Foundations course (listed above). For students wanting top scores on the ACT and SAT, here is a list of mathematical content to be reviewed that is not explicitly taught in the Data Science Foundations course:

ACT
- Operations with complex numbers;
- Properties of rational exponents;
- Trigonometric functions, including the unit circle and their graphs;
- Properties of logarithms (and their relationship to exponential expressions);
- Domain and range of polynomial and rational functions, including an understanding of asymptotes;
- Remainder Theorem for polynomials;
- Absolute value equations and inequalities.

SAT
- Simplifying rational expressions and solving simple rational equations;
- Properties of rational exponents;
- Solving simple radical equations;
- Trigonometric functions, including the unit circle and their graphs;
- Operations with complex numbers;
- Absolute value equations.

Discrete Math/Computer Science. This course still is being created and guidance will be updated once the course curriculum and standards are set.

REFERENCES

Morrison, N. (2020). It's GPAs not standardized tests that predict college success. *Forbes.* Retrieved from: https://www.forbes.com/sites/nickmorrison/2020/01/29/its-gpas-not-standardized-tests-that-predict-college-success/?sh=22eedf0f32bd

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