Pennsylvania Mathematics

Grades 9, 10, 11, 12

Adopted 2014

Numbers and Operations CC.2.1

(F) Number and Quantity

1. Apply and extend the properties of exponents to solve problems with rational exponents. CC.2.1.HS.F.1
2. Apply properties of rational and irrational numbers to solve real world or mathematical problems. CC.2.1.HS.F.2
3. Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. CC.2.1.HS.F.3
4. Use units as a way to understand problems and to guide the solution of multi-step problems. CC.2.1.HS.F.4
5. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. CC.2.1.HS.F.5
6. Extend the knowledge of arithmetic operations and apply to complex numbers. CC.2.1.HS.F.6
7. Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems. CC.2.1.HS.F.7

Algebraic Concepts CC.2.2

(C) Functions

1. Use the concept and notation of functions to interpret and apply them in terms of their context. CC.2.2.HS.C.1
2. Graph and analyze functions and use their properties to make connections between the different representations. CC.2.2.HS.C.2
3. Write functions or sequences that model relationships between two quantities. CC.2.2.HS.C.3
4. Interpret the effects transformations have on functions and find the inverses of functions. CC.2.2.HS.C.4
5. Construct and compare linear, quadratic, and exponential models to solve problems. CC.2.2.HS.C.5
6. Interpret functions in terms of the situations they model. CC.2.2.HS.C.6
7. Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. CC.2.2.HS.C.7
8. Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. CC.2.2.HS.C.8

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9. Prove the Pythagorean identity and use it to calculate trigonometric ratios. CC.2.2.HS.C.9

(D) Algebra

1. Interpret the structure of expressions to represent a quantity in terms of its context. CC.2.2.HS.D.1
2. Write expressions in equivalent forms to solve problems. CC.2.2.HS.D.2
3. Extend the knowledge of arithmetic operations and apply to polynomials. CC.2.2.HS.D.3
4. Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs. CC.2.2.HS.D.4
5. Use polynomial identities to solve problems. CC.2.2.HS.D.5
6. Extend the knowledge of rational functions to rewrite in equivalent forms. CC.2.2.HS.D.6
7. Create and graph equations or inequalities to describe numbers or relationships. CC.2.2.HS.D.7
8. Apply inverse operations to solve equations or formulas for a given variable. CC.2.2.HS.D.8
9. Use reasoning to solve equations and justify the solution method. CC.2.2.HS.D.9
10. Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. CC.2.2.HS.D.10

Geometry CC.2.3

(A) Geometry

1. Use geometric figures and their properties to represent transformations in the plane. CC.2.3.HS.A.1
2. Apply rigid transformations to determine and explain congruence. CC.2.3.HS.A.2
3. Verify and apply geometric theorems as they relate to geometric figures. CC.2.3.HS.A.3
4. Apply the concept of congruence to create geometric constructions. CC.2.3.HS.A.4
5. Create justifications based on transformations to establish similarity of plane figures. CC.2.3.HS.A.5
6. Verify and apply theorems involving similarity as they relate to plane figures. CC.2.3.HS.A.6
7. Apply trigonometric ratios to solve problems involving right triangles. CC.2.3.HS.A.7
8. Apply geometric theorems to verify properties of circles. CC.2.3.HS.A.8
9. Extend the concept of similarity to determine arc lengths and areas of sectors of circles. CC.2.3.HS.A.9

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10. Translate between the geometric description and the equation for a conic section. CC.2.3.HS.A.10
11. Apply coordinate geometry to prove simple geometric theorems algebraically. CC.2.3.HS.A.11
12. Explain volume formulas and use them to solve problems. CC.2.3.HS.A.12
13. Analyze relationships between two-dimensional and three-dimensional objects. CC.2.3.HS.A.13
14. Apply geometric concepts to model and solve real world problems. CC.2.3.HS.A.14

Measurement, Data, and Probability CC.2.4

(B) Statistics and Probability

1. Summarize, represent, and interpret data on a single count or measurement variable. CC.2.4.HS.B.1
2. Summarize, represent, and interpret data on two categorical and quantitative variables. CC.2.4.HS.B.2
3. Analyze linear models to make interpretations based on the data. CC.2.4.HS.B.3
4. Recognize and evaluate random processes underlying statistical experiments. CC.2.4.HS.B.4
5. Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. CC.2.4.HS.B.5
6. Use the concepts of independence and conditional probability to interpret data. CC.2.4.HS.B.6
7. Apply the rules of probability to compute probabilities of compound events in a uniform probability model. CC.2.4.HS.B.7

The Standards of Mathematical Practices

1. **Make sense of problems and persevere in solving them.** MP.1
2. **Construct viable arguments and critique the reasoning of others.** MP.2
3. **Use appropriate tools strategically.** MP.3
4. **Look for and make use of structure.** MP.4
5. **Reason abstractly and quantitatively.** MP.5
6. **Model with mathematics.** MP.6
7. **Attend to precision.** MP.7
8. **Look for and express regularity in repeated reasoning.** MP.8