

## CCGPS ADVANCED ALGEBRA CONTENT MAP

| Unit 1: Inferences and Conclusions from Data |  |   |                 |
|--|--|---|-----------------|
| Lesson                                       | Sub-lesson number  | Title   | Standard(s)     |
| <b>Lesson 1</b>                              | <b>Summarizing and Interpreting Data</b>                     |   |                 |
|  | 1.1.1  | Describing Data Sets  | MCC9–12.S.ID.2★ |
|  | 1.1.2  | Comparing Data Sets   | MCC9–12.S.ID.2★ |
| <b>Lesson 2</b>                              | <b>Using the Normal Curve</b>                                |   |                 |
|  | 1.2.1  | Normal Distributions and the 68–95–99.7 Rule                | MCC9–12.S.ID.4★ |
|  | 1.2.2  | Standard Normal Calculations                                | MCC9–12.S.ID.4★ |
|  | 1.2.3  | Assessing Normality   | MCC9–12.S.ID.4★ |
| <b>Lesson 3</b>                              | <b>Populations Versus Random Samples and Random Sampling</b> |   |                 |
|  | 1.3.1  | Differences Between Populations and Samples                 | MCC9–12.S.IC.1★ |
|  | 1.3.2  | Simple Random Sampling                                      | MCC9–12.S.IC.2★ |
|  | 1.3.3  | Other Methods of Random Sampling                            | MCC9–12.S.IC.2★ |
| <b>Lesson 4</b>                              | <b>Surveys, Experiments, and Observational Studies</b>       |   |                 |
|  | 1.4.1  | Identifying Surveys, Experiments, and Observational Studies | MCC9–12.S.IC.3★ |
|  | 1.4.2  | Designing Surveys, Experiments, and Observational Studies   | MCC9–12.S.IC.3★ |
| <b>Lesson 5</b>                              | <b>Estimating Sample Proportions and Sample Means</b>        |   |                 |
|  | 1.5.1  | Estimating Sample Proportions                               | MCC9–12.S.IC.4★ |
|  | 1.5.2  | The Binomial Distribution                                   | MCC9–12.S.IC.4★ |
|  | 1.5.3  | Estimating Sample Means                                     | MCC9–12.S.IC.4★ |
|  | 1.5.4  | Estimating with Confidence                                  | MCC9–12.S.IC.4★ |
| <b>Lesson 6</b>                              | <b>Comparing Treatments and Reading Reports</b>              |   |                 |
|  | 1.6.1  | Evaluating Treatments                                       | MCC9–12.S.IC.5★ |
|  | 1.6.2  | Designing and Simulating Treatments                         | MCC9–12.S.IC.5★ |
|  | 1.6.3  | Reading Reports   | MCC9–12.S.IC.6★ |

| <b>Unit 2: Polynomial Functions</b> |   |   |   |
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| <b>Lesson</b>                       | <b>Sub-lesson number</b>                                    | <b>Title</b>                                    | <b>Standard(s)</b>  |
| <b>Lesson 1</b>                     | <b>Polynomial Structures and Operating with Polynomials</b> |   |   |
|                                     | 2.1.1   | Structures of Expressions                       | MCC9–12.A.SSE.1a★   |
|                                     | 2.1.2   | Adding and Subtracting Polynomials              | MCC9–12.A.APR.1   |
|                                     | 2.1.3   | Multiplying Polynomials                         | MCC9–12.A.APR.1   |
| <b>Lesson 2</b>                     | <b>Proving Identities</b>                                   |   |   |
|                                     | 2.2.1   | Polynomial Identities                           | MCC9–12.A.SSE.1b★<br>MCC9–12.A.SSE.2<br>MCC9–12.A.APR.4   |
|                                     | 2.2.2   | Complex Polynomial Identities                   | MCC9–12.N.CN.8 (+)<br>MCC9–12.A.SSE.1b★<br>MCC9–12.A.SSE.2<br>MCC9–12.A.APR.4                       |
|                                     | 2.2.3   | The Binomial Theorem                            | MCC9–12.A.SSE.1a★<br>MCC9–12.A.SSE.1b★<br>MCC9–12.A.SSE.2<br>MCC9–12.A.APR.4<br>MCC9–12.A.APR.5 (+) |
| <b>Lesson 3</b>                     | <b>Graphing Polynomial Functions</b>                        |   |   |
|                                     | 2.3.1   | Describing End Behavior and Turns               | MCC9–12.F.IF.7c★  |
|                                     | 2.3.2   | The Remainder Theorem                           | MCC9–12.A.APR.2   |
|                                     | 2.3.3   | Finding Zeros                                   | MCC9–12.A.APR.3<br>MCC9–12.N.CN.9 (+)<br>MCC9–12.F.IF.7c★   |
|                                     | 2.3.4   | The Rational Root Theorem                       | MCC9–12.A.APR.3   |
| <b>Lesson 4</b>                     | <b>Solving Systems of Equations with Polynomials</b>        |   |   |
|                                     | 2.4.1   | Solving a Linear-Polynomial System of Equations | MCC9–12.A.REI.7<br>MCC9–12.A.REI.11★  |
| <b>Lesson 5</b>                     | <b>Geometric Series</b>                                     |   |   |
|                                     | 2.5.1   | Geometric Sequences                             | MCC9–12.A.SSE.4★  |
|                                     | 2.5.2   | Sum of a Finite Geometric Series                | MCC9–12.A.SSE.4★  |
|                                     | 2.5.3   | Sum of an Infinite Geometric Series             | MCC9–12.A.SSE.4★  |

| <b>Unit 3: Rational and Radical Relationships</b> |   |  |  |
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| <b>Lesson</b>                                     | <b>Sub-lesson number</b>                      | <b>Title</b>                                 | <b>Standard(s)</b>                                     |
| <b>Lesson 1</b>                                   | <b>Operating with Rational Expressions</b>    |  |  |
|   | 3.1.1   | Adding and Subtracting Rational Expressions  | MCC9–12.A.APR.7 (+)                                    |
|   | 3.1.2   | Multiplying Rational Expressions             | MCC9–12.A.APR.7 (+)                                    |
|   | 3.1.3   | Dividing Rational Expressions                | MCC9–12.A.APR.6<br>MCC9–12.A.APR.7 (+)                 |
| <b>Lesson 2</b>                                   | <b>Solving Rational and Radical Equations</b> |  |  |
|   | 3.2.1   | Creating and Solving Rational Equations      | MCC9–12.A.CED.1★<br>MCC9–12.A.REI.2                    |
|   | 3.2.2   | Creating and Solving Rational Inequalities   | MCC9–12.A.CED.1★<br>MCC9–12.A.REI.2                    |
|   | 3.2.3   | Solving Radical Equations                    | MCC9–12.A.REI.2  |
| <b>Lesson 3</b>                                   | <b>Graphing Rational Functions</b>            |  |  |
|   | 3.3.1   | Creating Rational Equations in Two Variables | MCC9–12.A.CED.2★                                       |
|   | 3.3.2   | Graphing Rational Functions                  | MCC9–12.A.CED.2★                                       |
|   |   |  | MCC9–12.F.IF.4★<br>MCC9–12.F.IF.5★                     |
|   | 3.3.3   | Finding the Zeros                            | MCC9–12.F.IF.4★<br>MCC9–12.F.IF.7d★ (+)                |
| 3.3.4   | Solving a System of Rational Equations        | MCC9–12.A.REI.11★                            |  |
| <b>Lesson 4</b>                                   | <b>Graphing Radical Functions</b>             |  |  |
|   | 3.4.1   | Creating Radical Equations in Two Variables  | MCC9–12.A.CED.2★                                       |
|   | 3.4.2   | Graphing Radical Functions                   | MCC9–12.F.IF.4★<br>MCC9–12.F.IF.5★<br>MCC9–12.F.IF.7b★ |
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| <b>Lesson 5</b>                                   | <b>Comparing Properties of Functions</b>      |  |  |
|   | 3.5.1   | Comparing Properties of Functions            | MCC9–12.F.IF.9   |

| <b>Unit 4: Exponential and Logarithmic Functions</b> |   |   |   |
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| <b>Lesson</b>  | <b>Sub-lesson number</b>                              | <b>Title</b>                                      | <b>Standard(s)</b>  |
| <b>Lesson 1</b>                                      | <b>Exponential Functions</b>                          |   |   |
|  | 4.1.1   | Rewriting Exponential Functions                   | MCC9–12.A.SSE.3c★<br>MCC9–12.F.IF.8b  |
|  | 4.1.2   | Properties of Exponential Functions               | MCC9–12.F.IF.7e★  |
| <b>Lesson 2</b>                                      | <b>Introducing Logarithmic Functions</b>              |   |   |
|  | 4.2.1   | Defining Logarithms                               | MCC9–12.F.IF.8b<br>MCC9–12.F.BF.5 (+)   |
|  | 4.2.2   | Graphs of Logarithmic Functions                   | MCC9–12.F.IF.7e★  |
|  | 4.2.3   | Properties of Logarithms                          | MCC9–12.F.IF.8b<br>MCC9–12.F.BF.5 (+)   |
| <b>Lesson 3</b>                                      | <b>Solving Exponential Equations Using Logarithms</b> |   |   |
|  | 4.3.1   | Common Logarithms                                 | MCC9–12.A.SSE.3c★<br>MCC9–12.F.IF.8b<br>MCC9–12.F.BF.5 (+)<br>MCC9–12.F.LE.4★ |
|  | 4.3.2   | Natural Logarithms                                | MCC9–12.F.IF.8b<br>MCC9–12.F.BF.5 (+)<br>MCC9–12.F.LE.4★                      |
| <b>Unit 5: Trigonometric Functions</b>               |   |   |   |
| <b>Lesson</b>  | <b>Sub-lesson number</b>                              | <b>Title</b>                                      | <b>Standard(s)</b>  |
| <b>Lesson 1</b>                                      | <b>Radians and the Unit Circle</b>                    |   |   |
|  | 5.1.1   | Radians   | MCC9–12.F.TF.1<br>MCC9–12.F.TF.2  |
|  | 5.1.2   | The Unit Circle                                   | MCC9–12.F.TF.2  |
|  | 5.1.3   | Special Angles in the Unit Circle                 | MCC9–12.F.TF.2  |
|  | 5.1.4   | Evaluating Trigonometric Functions                | MCC9–12.F.TF.2  |
| <b>Lesson 2</b>                                      | <b>Graphing Trigonometric Functions</b>               |   |   |
|  | 5.2.1   | Graphing the Sine Function                        | MCC9–12.F.IF.7e★  |
|  | 5.2.2   | Graphing the Cosine Function                      | MCC9–12.F.IF.7e★  |
|  | 5.2.3   | Using Sine and Cosine to Model Periodic Phenomena | MCC9–12.F.TF.5★   |
| <b>Lesson 3</b>                                      | <b>A Pythagorean Identity</b>                         |   |   |
|  | 5.3.1   | A Pythagorean Identity                            | MCC9–12.F.TF.8  |

## Unit 6: Mathematical Modeling

| Lesson   | Sub-lesson number         | Title   | Standard(s)  |
|----------|---------------------------|---|--|
| Lesson 1 | <b>Creating Equations</b> |   |  |
|          | 6.1.1                     | Creating Equations in One Variable                      | MCC9–12.A.CED.1★   |
|          | 6.1.2                     | Creating Equations in Two Variables                     | MCC9–12.A.CED.2★<br>MCC9–12.F.IF.4★<br>MCC9–12.F.IF.5★<br>MCC9–12.F.IF.7a★<br>MCC9–12.F.IF.7c★<br>MCC9–12.F.IF.7e★<br>MCC9–12.F.IF.8a<br>MCC9–12.F.IF.8b<br>MCC9–12.F.BF.1a★ |
|          | 6.1.3                     | Creating Exponential and Logarithmic Equations          | MCC9–12.A.CED.2★<br>MCC9–12.F.IF.4★<br>MCC9–12.F.IF.5★<br>MCC9–12.F.IF.7e★<br>MCC9–12.F.IF.8b<br>MCC9–12.F.BF.1a★  |
|          | 6.1.4                     | Creating Rational, Radical, and Trigonometric Functions | MCC9–12.A.CED.2★<br>MCC9–12.F.IF.4★<br>MCC9–12.F.IF.5★<br>MCC9–12.F.IF.7b★<br>MCC9–12.F.IF.7d★ (+)<br>MCC9–12.F.IF.7e★<br>MCC9–12.F.BF.1a★                                   |

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| <b>Lesson 2</b> | <b>Piecewise, Step, and Absolute Value Functions</b>                |  |  |
| 6.2.1           | Piecewise Functions   | MCC9–12.A.CED.2★<br>MCC9–12.F.IF.4★<br>MCC9–12.F.IF.5★<br>MCC9–12.F.IF.7b★ |  |
| 6.2.2           | Step Functions  | MCC9–12.A.CED.2★<br>MCC9–12.F.IF.4★<br>MCC9–12.F.IF.5★<br>MCC9–12.F.IF.7b★ |  |
| 6.2.3           | Absolute Value Functions  | MCC9–12.A.CED.2★<br>MCC9–12.F.IF.4★<br>MCC9–12.F.IF.5★<br>MCC9–12.F.IF.7b★ |  |
| <b>Lesson 3</b> | <b>Working with Constraint Equations and Inequalities</b>           |  |  |
| 6.3.1           | Creating Constraint Equations                                       | MCC9–12.A.CED.2★<br>MCC9–12.A.CED.3★                                       |  |
| 6.3.2           | Creating Constraint Inequalities                                    | MCC9–12.A.CED.2★<br>MCC9–12.A.CED.3★                                       |  |
| 6.3.3           | Rearranging Formulas  | MCC9–12.A.CED.4★   |  |
| <b>Lesson 4</b> | <b>Transformations of Graphs</b>                                    |  |  |
| 6.4.1           | Transformations of Parent Graphs                                    | MCC9–12.F.BF.3   |  |
| 6.4.2           | Recognizing Odd and Even Functions                                  | MCC9–12.F.BF.3   |  |
| <b>Lesson 5</b> | <b>Comparing Properties Within and Between Functions</b>            |  |  |
| 6.5.1           | Reading and Identifying Key Features of Real-World Situation Graphs | MCC9–12.F.IF.4★<br>MCC9–12.F.IF.5★<br>MCC9–12.F.IF.6★                      |  |
| 6.5.2           | Calculating Average Rates of Change                                 | MCC9–12.F.IF.6★  |  |
| 6.5.3           | Comparing Functions   | MCC9–12.F.IF.6★<br>MCC9–12.F.IF.9  |  |

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| <b>Lesson 6</b> | <b>Operating on Functions</b> |   |  |
|                 | 6.6.1                         | Adding, Subtracting, Multiplying, and Dividing Functions    | MCC9–12.F.BF.1b★                           |
|                 | 6.6.2                         | Composing Functions   | MCC9–12.F.BF.1c★ (+)                       |
| <b>Lesson 7</b> | <b>Inverses of Functions</b>  |   |  |
|                 | 6.7.1                         | Finding and Graphing Inverses of Functions                  | MCC9–12.F.BF.4a                            |
|                 | 6.7.2                         | Verifying Inverses of Functions and Reading Values          | MCC9–12.F.BF.4b (+)<br>MCC9–12.F.BF.4c (+) |
| <b>Lesson 8</b> | <b>Geometric Modeling</b>     |   |  |
|                 | 6.8.1                         | Two-Dimensional Cross Sections of Three-Dimensional Objects | MCC9–12.G.GMD.4<br>MCC9–12.G.MG.1★         |
|                 | 6.8.2                         | Density   | MCC9–12.G.MG.2★                            |
|                 | 6.8.3                         | Design  | MCC9–12.G.MG.3★                            |