**Connecticut Core Algebra 2**

**Scope and Sequence**

**Made for 45 Minute Classes**

Experience has demonstrated that when introducing a new curriculum, teachers need more time the first year or two to adjust. In addition, Algebra 2 is dependent upon Algebra 1 and we expect that implementation of the algebra 1 curriculum will take a few years of adjustment. The Standards also assume that some of the material in the algebra 1 curriculum will be addressed in grade 8 so we have made suggestions to assist with dealing with this domino effect. For this reason, we have suggested that five of the eight Algebra 2 units be implemented the first year to permit completing units 7 and 8 which may have been omitted in part or whole in algebra 1; six of the Algebra 2 units be implemented in the second year and completion of unit 7 or 8 but not both from Algebra 1, and seven units plus some or all of unit 8 of Algebra 2 in the third year if some earlier + activities are omitted. However, honors and advanced classes may be able to skip to sequence B immediately. Also Sequence B assumes the sixth unit of Algebra 2 is Trigonometry but your district may prefer to do unit 7 on Statistics because students did have trigonometry of the right triangle in Geometry and the new SAT has both some trigonometry and some statistics. If time permits, the circular functions can be studied at the end of the Algebra 2 year. A total of 170 instructional days are planned, leaving the remaining 10 days of the school year for examinations and other administrative changes to the schedule.

The number of days allocated to each unit is shown in this chart.

|  |  |  |  |
| --- | --- | --- | --- |
| Unit | Year 1/ Sequence A | Year 2/ Sequence B | Year 3/ Sequence C |
| 1 | 31 | 28 | 24 no lesson 5 |
| 2 | 24 | 24 | 24 |
| Unit 8 from Algebra 1 | 16 | 12\* | ------ |
| 3 | 26 | 25 | 22 no lesson 4 |
| 4 | 28 | 26 | 24 |
| 5- | 30 | 30 | 30 |
| Unit 7 from Algebra 1  | 15 | 4 + 12\* | --- |
| 6  | --- | 22\*\* | 21 |
| 7 | --- | --- | 16 no lesson 6 |
| 8 | --- | --- | 9 |
| Total | 170 | 171 | 170 |

\*The 12 days are for either unit 7 or unit 8 from algebra 1 but not both

\*\*Districts can do unit 7 (14 to 20 days) instead of unit 6 first and then complete some of unit 6 with the remaining days.

Pacing charts with additional pacing suggestions for each of the three years are given below.

**Algebra 2 Sequence**

**Sequence A should be considered if:**

1. Most or all of units 7 and 8 from Algebra 1 must also be studied because there was no time to complete those two units in Algebra 1 OR
2. This is your first year using this new curriculum and students enrolled in Algebra 2 have not completed units 7 and 8 from Algebra 1 and your class consists mainly of students needing support and/or students with relatively average mathematical backgrounds.

If your district has completed either unit 7 or 8 in Algebra 1 but not both OR your class consists mainly of students who need greater mathematical challenge, please consider using Sequence B.

If your district has completed both units 7 and 8 in Algebra 1 you should consider Sequence B or Sequence C for students needing greater mathematical challenge for your first year of implementation.

**Sequence B should be considered if:**

1. Your district needs to complete units 7 or 8 but not both units from algebra 1 OR
2. This is the district’s first year of implementation of the curriculum for students with stronger mathematical backgrounds- Honors or Level 1 regardless of Algebra 1 unit completion OR
3. This is the second year of implementation of the curriculum for all students.

**Sequence C should be considered if**

1. Students have completed units 7 and 8 in Algebra 1
2. The class is an honors class
3. The class has mostly students needing additional mathematical challenge-and it is year 2 or year 3 of implementation of this curriculum.

**Algebra 2 Common Core**

**Scope and Sequence---A**

**Made for 45 Minute Classes**

**\***The lessons or activities marked by a + are for **STEM** intended student classes. Not all + activities need to be assigned in STEM intending student classes. Teacher choice should dictate which ones are assigned.

**\*\***Year 1 includes units 7 and 8 from Algebra 1 and Units 1 – 5 of Algebra 2. (The actual materials from Algebra 1 will be by teacher selection based on what students completed in Algebra 1 or grade 8.)

**\*\*\***Each unit for Sequence A or B has additional days added to the time allocated for Sequence C and should be used by teacher choice.

**Total:** 170 days which includes 14 additional days and 31 days to address Algebra 1 material from unit 7 and unit 8 of Algebra 1.

**Unit 1: Functions and Inverse Functions**

**Time:** 31 days including Lesson 5

\*This unit has 6 additional days added

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Systems of Linear Inequalities and Linear Programming | A.REI.10, A.REI.11, A.REI.12 | 5 days |
| 2 | Relations and Functions | F.IF.1, F.IF.2, F.IF.5 | 2 days |
| 3 | Types of Functions | A.CED.2, F.IF.5,F.IF.7b, F.IF.9 | 3 days |
| 4 | Building New Functions from Old | F.BF.1b, F.BF.3 | 4 days |
| R/T | Review and Midunit test |  | 2 days |
| 5 | Composition of Functions | F.BF.1C(+) | 3 days |
| 6 | Inverse Functions | F.BF.4A, F.BF.4B(+)/C(+) | 3 days |
| 7 | Root Functions | F.IF.7b, F.BF.4 | 2 days  |
| PT | Corporate Logo |  | 1 day |
| R/T | Review and Test |  | 2 days |

**Unit 2: Quadratic Functions**

**Time:**  40 days

\*This unit has 16 additional days added to complete unit 8 from Algebra 1

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Transforming Quadratic Functions | F.IF.4, F.IF.7, F.IF.7a | 3 days  |
| 2 | Methods for Solving Quadratic Equations | A.SSE.3, A.SSE.3a, A.SSE.3b, A.REI.4, A.REI.4b, F.IF.7b | 4 days |
| 3 | Complex Numbers | N.RN.3, N.CN.1, N.CN.2, N.CN.7 | 3 days |
| 4 | Fundamental Theorem of Algebra | N.CN.2, N.CN.9(+) | 3 days |
| T | Mid unit |  | 1 day |
| 5 | Modeling with Quadratic Functions | F.BF.1, A.CED.1, A.CED.2, F.IF.4, F.IF.7, F.IF.7a | 4 days |
| 6 | Radical Equations | A.REI.2, A.CED.1, A.CED.2, F.IF.4, F.IF.7a, F.IF.7b | 3 days |
| PT | Modeling Basketball Shots |  | 1 day |
| R/T | Review and End of Unit Test |  | 2 days |

**Unit 3: Polynomials**

**Time:** 26 days including lesson 4

\*This unit has 3 additional days added

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Properties of Polynomial Functions | F.IF.7c, F.IF.7, F.IF.4 | 4 days |
| 2 | Polynomial Operations | A.APR.1, A.APR.2 | 3 days |
| 3 | Factoring Polynomials | A.APR.3, A.SSE.2, A.APR.4 | 4 days |
| 4 | Binomial Theorem | A.APR.5(+) | 2 days |
| R/T | Review and Mid Unit Test |  | 2 days |
| 5 | Polynomial Applications | A.CED.2 | 3 days |
| 6 | Exponential vs Polynomial Growth | F.IF.9, F.LE.3 | 2 days |
| PT | Polynomials and Images  |  | 1 day |
| R/T | Review and Test |  | 2 days  |

**Unit 4: Rational and Power Functions**

**Time:**  28 days

\*This unit has 5 additional days added

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Indirect Variation Functions | A.SSE.1, N.RN.1, N.RN.2, F.IF.4, F.IF.5, F.IF.7, F.IF.9, A.CED.3, A.REI.10. A.CED.1 | 4 days |
| 2 | Modeling with Power Functions | A.SSE.1, N.RN.1, N.RN.2, F.IF.4, F.IF.5, F.IF.7, A.CED.1, A.CED.3, A.REI.10 | 4 days |
| 3 | Graphs of Rational Functions | A.SSE.1b, A.APR.1b. A.APR.7(+), F.IF.4, F.IF.5, F.IF.7, F.IF.7d(+),F.IF.9, F.BF.3, A.REI.10  | 4 days |
| T | Mid unit |  | 1 day |
| 4 | Operations on Rational Expressions | A.SSE.1b, A.APR.6, A.APR.7(+) | 3 days |
| 5 | Operations on Rational Equations | A.SSE.1b, A.REI.2, A.REI.11, A.CED.1 | 4 days |
| PT | How Your Body Manages Alcohol  |  | 1 day |
| R/T | Review and Test |  | 2 days |

**Unit 5: Exponential and Logarithm Families**

**Time:**  45 days

\*This unit has 15 additional days added so the class can do a consider able amount of unit 7 from algebra 1.

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Logarithmic Functions – Inverse of Exponentials | F.IF.7.e, F.BF.5, F.BF.4a,FB.F.4b(+),FB.F.4c(+) | 3 days |
| 2 | Natural Logarithm and Base e | F.BF.5,A.REI.2 | 3 days |
| 3 | Logarithmic Scales | F.LE.4 | 4 days  |
| 4 | Parameters of Exponential Functions | A.SSE.1b, F.IF.8, F.LE.4, F.LE.5, F.BF.3 | 4 days |
| R/MT | Review and Mid Unit Test |  | 2 days |
| 5 | Curve Fitting with Exponential and Logarithmic Functions | A.CED.1, A.CED.2, F.BF.3, F.LE.5 | 4 days |
| 6 | Geometric Series | A.SSE.4 | 3 days |
| 7 | Financial Mathematics | A.CED.1, A.CED.2, F.LE.5, A.SSE.4 | 4 days |
| PT | Rocky Hill Dinosaur Park Timeline  |  | 1 day |
| R/T | Review and Test |  | 2 days |

**Algebra 2 Common Core**

**Scope and Sequence--B**

**Made for 45 Minute Classes**

**\***The lessons marked (+) are for **STEM** intended student classes. Not all + activities need to be assigned in STEM intended student classes. Teacher choice should dictate which ones are assigned.

**\*\***Year 2 includes Units 1 – 6 of Algebra 2 and unit 7 or 8 but not both from Algebra 1

**\*\*\***Each unit for sequence A and B has additional days added to the time allocated to Sequence C and should be used by teacher choice.

**Total:** 170 days which includes 34 days that can be used to review or do parts of units 7 or 8 but not both units from Algebra 1

**Unit 1: Functions and Inverse Functions**

**Time:** 28 days including lesson 5

\* This unit has 1 additional day added

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Systems of Linear Inequalities and Linear Programming | A.REI.10, A.REI.11, A.REI.12 | 5 days |
| 2 | Relations and Functions | F.IF.1, F.IF.2, F.IF.5 | 2 days |
| 3 | Types of Functions | A.CED.2, F.IF.5, F.IF.7b, F.IF.9 | 3 days |
| 4 | Building New Functions from Old | F.BF.1b, F.BF.3 | 4 days |
| T | Mid-unit test |  | 1 day |
| 5 | Composition of Functions | F.BF.1C(+) | 3 days |
| 6 | Inverse Functions | F.BF.4,F.BF.4A, F.BF.4B(+)/C(+) | 3 days |
| 7 | Root Functions | F.IF.7b, F.BF.4 | 2 days  |
| PT | Corporate Logo |  | 1 day |
| R/T | Review and End of unit Test |  | 2 days |

**Unit 2: Quadratic Functions**

**Time:**  36 days

\*This unit has 12 additional days added. If unit 8 was completed in Algebra 1 but not unit 7 these 12 days should be allocated to unit 5.

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Transforming Quadratic Functions | F.IF.4, F.IF.7, F.IF.7a | 3 days  |
| 2 | Methods for Solving Quadratic Equations | A.SSE.3, A.SSE.3a, A.SSE.3b, A.REI.4, A.REI.4b, F.IF.7b | 4 days |
| 3 | Complex Numbers | N.RN.3, N.CN.1, N.CN.2, N.CN.7 | 3 days |
| 4 | Fundamental Theorem of Algebra | N.CN.2, N.CN.9(+) | 3 days |
| T | Mid-unit test |  | 1 day |
| 5 | Modeling with Quadratic Functions | F.BF.1, A.CED.1, A.CED.2, F.IF.4, F.IF.7, F.IF.7a | 4 days |
| 6 | Radical Equations | A.REI.2, A.CED.1, A.CED.2, F.IF.4, F.IF.7a, F.IF.7b | 3 days |
| PT | Modeling Basketball Shots |  | 1 day |
| R/T | Review and End of unit Test |  | 2 days |

**Unit 3: Polynomials**

**Time:** 25 days including lesson 4

\* This unit has 2 additional days added

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Properties of Polynomial Functions | F.IF.7c, F.IF.7, F.IF.4 | 4 days |
| 2 | Polynomial Operations | A.APR.1, A.APR.2 | 3 days |
| 3 | Factoring Polynomials | A.APR.3, A.SSE.2, A.APR.4 | 4 days |
| 4 | Binomial Theorem | A.APR.5(+) | 2 days |
| R/T | Review and Mid unit test |  | 2 days |
| 5 | Polynomial Applications | A.CED.2 | 3 days |
| 6 | Exponential vs Polynomial Growth | F.IF.9, F.LE.3 | 2 days |
| PT | Polynomials and Images  |  | 1 day |
| R/T | Review and Test |  | 2 days  |

**Unit 4: Rational and Power Functions**

**Time:**  26 days

\*This unit has 2 additional days added

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Indirect Variation Functions | A.SSE.1, N.RN.1, N.RN.2, F.IF.4, F.IF.5, F.IF.7, F.IF.9, A.CED.3, A.REI.10. A.CED.1 | 4 days |
| 2 | Modeling with Power Functions | A.SSE.1, N.RN.1, N.RN.2, F.IF.4, F.IF.5, F.IF.7, A.CED.1, A.CED.3, A.REI.10 | 4 days |
| 3 | Graphs of Rational Functions | A.SSE.1b, A.APR.1b. A.APR.7(+), F.IF.4, F.IF.5, F.IF.7, F.IF.7d(+), F.IF.9, F.BF.3, A.REI.10  | 4 days |
| T | Mid unit test |  | 1 day |
| 4 | Operations on Rational Expressions | A.SSE.1b, A.APR.6, A.APR.7(+) | 3 days |
| 5 | Operations on Rational Equations | A.SSE.1b, A.REI.2, A.REI.11, A.CED.1 | 4 days |
| PT | How Your Body Manages Alcohol  |  | 1 day |
| R/T | Review and Test |  | 2 days |

**Unit 5: Exponential and Logarithm Families**

**Time:**  34 days

\*This unit has 4 additional days added if unit 7 in Algebra 1 was completed and has the 12 days from unit 2 if unit 7 was not done but unit 8 was so there will then be 16 days to address unit 7 from Algebra 1 first.

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Logarithmic Functions – Inverse of Exponentials | F.IF.7.e, F.BF.4a, F.BF.4b(+),F.BF.4c(+) F.BF.5 | 3 days |
| 2 | Natural Logarithm and Base e | F.BF.5, A.REI.2 | 3 days |
| 3 | Logarithmic Scales | F.LE.4 | 4 days  |
| 4 | Parameters of Exponential Functions | A.SSE.1b, F.IF.8, F.LE.4, F.LE.5,F.BF.3 | 4 days |
| R/MT | Review and Mid Unit Test |  | 2 days |
| 5 | Curve Fitting with Exponential and Logarithmic Functions | A.CED.1, A.CED.2, F.BF.3, F.LE.5 | 4 days |
| 6 | Geometric Series | A.SSE.4 | 3 days |
| 7 | Financial Mathematics | A.CED.1, A.CED.2, F.LE.5, A.SSE.4 | 4 days |
| PT | Rocky Hill Dinosaur Park Timeline  |  | 1 day |
| R/T | Review and Test |  | 2 days |

**Unit 6: Trig Functions**

**Time:** 22 days

\*This unit has 1 additional day added

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | The Unit Circle and Radian Measure | F.TF.1, F.TF.2 | 4 days |
| 2 | Unit Circle Definition of Trig Functions | F.TF.2, F.TF.3(+) | 3 days |
| R/MT | Review and Mid Unit Test |  | 2 days |
| 3 | Graphs of Trigonometric Functions | F.IF.7e, F.TF.4(+) | 3 days |
| 4 | Transformations of Trig Functions | F.IF.7.e, F.BF.3 | 2 days |
| 5 | Models of Periodic Behavior | A.CED.2, F.TF.5 | 2 days |
| 6 | Trig Equations and Identities | F.TF.8, F.TF.9(+) | 3 days |
| PF | Find a Trigonometric Function |  | 1 day |
| R/T | Review and Test |  | 2 days  |

Note: unit 6 does not need unit 7 and unit 7 does not need unit 6 so if your district prefers to do Trigonometry over the Reals in precalculus unit 7 can be done instead. Remember trig of the right triangle and radian measure were completed in geometry. See sequence C for pacing for Statistics unit 7 (14 days and 20 days if you do the optional investigations)

**Algebra 2 Common Core**

**Scope and Sequence--C**

**Made for 45 Minute Classes**

**\***The + lessons are for **STEM** intending student classes. Not all + activities need to be assigned in STEM intending student classes. Teacher choice should dictate which ones are assigned.

**\*\***Year 3 includes Units 1 – 7 and some or all of unit 8.

\*\*\*If a class is able to move at a faster rate, unit 8 material could be considered. Investigation 1 is a stand-alone, investigation 2 is a stand-alone, investigations 1 – 3 form a good small unit and units 1 - 4 also form an even more complete unit. Investigations 1 - 5 again are a unit and 6 is an enrichment, challenging, capstone investigation.

**Total:** 170 days that includes some + activities but omits the optional and + investigations. The 9 days allocated to unit 8 can be used for unit 8 ( investigations 1 – 3) or be used for lessons 3 and 4 in unit 7 or to do + investigations in units 1 and 3.

**Unit 1: Functions and Inverse Functions**

**Time:** 27 days including lesson 5 and a review day for the midunit test

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Systems of Linear Inequalities and Linear Programming | A.REI.10, A.REI.11, A.REI.12 | 5 days |
| 2 | Relations and Functions | F.IF.1, F.IF.2, F.IF.5 | 2 days |
| 3 | Types of Functions | A.CED.2, F.IF.5, F.IF.7b, F.IF.9 | 3 days |
| 4 | Building New Functions from Old | F.BF.1b, F.BF.3 | 4 days |
| R/T | Review and Midunit test |  | 2 days |
| 5 | Composition of Functions | F.BF.1C(+) | 3 days |
| 6 | Inverse Functions | F.BF.4A, F.BF.4B(+)/C(+) | 3 days |
| 7 | Root Functions | F.IF.7b, F.BF.4 | 2 days  |
| PT | Corporate Logo |  | 1 day |
| R/T | Review and Test |  | 2 days |

**Unit 2: Quadratic Functions**

**Time:**  24 days

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Transforming Quadratic Functions | F.IF.4, F.IF.7, F.IF.7a | 3 days  |
| 2 | Methods for Solving Quadratic Equations | A.SSE.3, A.SSE.3a, A.SSE.3b, A.REI.4, A.REI.4b, F.IF.7b | 3 days |
| 3 | Complex Numbers | N.RN.3, N.CN.1, N.CN.2, N.CN.7 | 3 days |
| 4 | Fundamental Theorem of Algebra | N.CN.2, N.CN.9(+) | 3 days |
| R/T | Review and midunit test |  | 2 days |
| 5 | Modeling with Quadratic Functions | F.BF.1, A.CED.1, A.CED.2, F.IF.4, F.IF.7, F.IF.7a | 4 days |
| 6 | Radical Equations | A.REI.2, A.CED.1, A.CED.2, F.IF.4, F.IF.7a, F.IF.7b | 3 days |
| PT | Modeling Basketball Shots |  | 1 day |
| R/T | Review and Test |  | 2 days |

**Unit 3: Polynomials**

**Time:** 24 days including lesson 4

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Properties of Polynomial Functions | F.IF.7c, F.IF.7, F.IF.4 | 4 days |
| 2 | Polynomial Operations | A.APR.1, A.APR.2 | 3 days |
| 3 | Factoring Polynomials | A.APR.3, A.SSE.2, A.APR.4 | 4 days |
| 4 | Binomial Theorem | A.APR.5(+) | 2 days |
| R/T | Min Unit test |  | 2 days |
| 5 | Polynomial Applications | A.CED.2 | 3 days |
| 6 | Exponential vs Polynomial Growth | F.IF.9, F.LE.3 | 2 days |
| PT | Polynomials and Images  |  | 1 day |
| R/T | Review and Test |  | 2 days  |

**Unit 4: Rational and Power Functions**

**Time:**  24 days

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Indirect Variation Functions | A.SSE.1, N.RN.1, N.RN.2, F.IF.4, F.IF.5, F.IF.7, F.IF.9, A.CED.3, A.REI.10. A.CED.1 | 4 days |
| 2 | Modeling with Power Functions | A.SSE.1, N.RN.1, N.RN.2, F.IF.4, F.IF.5, F.IF.7, A.CED.1, A.CED.3, A.REI.10 | 4 days |
| 3 | Graphs of Rational Functions | A.SSE.1b, A.APR.1b. A.APR.7(+), F.IF.4, F.IF.5, F.IF.7,F.IF.7d(+), F.IF.9, F.BF.3, A.REI.10  | 4 days |
| R/T | Review and Mid unit test |  | 2 days |
| 4 | Operations on Rational Expressions | A.SSE.1b, A.APR.6, A.APR.7(+) | 3 days |
| 5 | Operations on Rational Equations | A.SSE.1b, A.REI.2, A.REI.11, A.CED.1 | 4 days |
| PT | How Your Body Manages Alcohol  |  | 1 day |
| R/T | Review and Test |  | 2 days |

**Unit 5: Exponential and Logarithm Families**

**Time:**  30 days

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Logarithmic Functions – Inverses of Exponentials | F.IF.7.e,F.BF.4a, F.BF.5,F.BF.4b(+),F.BF.4c(+)  | 3 days |
| 2 | Natural Logarithm and Base e | F.BF.5, A.REI.2 | 3 days |
| 3 | Logarithmic Scales | F.LE.4 | 4 days  |
| 4 | Parameters of Exponential Functions | A.SSE.1b, F.IF.8, F.LE.4, F.LE.5, F.BF.3 | 4 days |
| R/MT | Review and Mid Unit Test |  | 2 days |
| 5 | Curve Fitting with Exponential and Logarithmic Functions | A.CED.1, A.CED.2, F.BF.3, F.LE.5 | 4 days |
| 6 | Geometric Series | A.SSE.4 | 3 days |
| 7 | Financial Mathematics | A.CED.1, A.CED.2, F.LE.5, A.SSE.4 | 4 days |
| PT | Rocky Hill Dinosaur Park Timeline  |  | 1 day |
| R/T | Review and Test |  | 2 days |

**Unit 6: Trig Functions**

**Time:** 21 days

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | The Unit Circle and Radian Measure | F.TF.1, F.TF.2 | 4 days |
| 2 | Unit Circle Definition of Trig Functions | F.TF.2, F.TF.3(+) | 3 days |
| R/MT | Review and Mid Unit Test |  | 2 days |
| 3 | Graphs of Trigonometric Functions | F.IF.7e, F.TF.4(+) | 2 days |
| 4 | Transformations of Trigonometric Functions | F.IF.7.e, F.BF.3 | 2 days |
| 5 | Models of Periodic Behavior | A.CED.2, F.TF.5 | 2 days |
| 6 | Trigonometric Equations and Identities | F.TF.8, F.TF.9(+) | 3 days |
| PT |  Find a Trigonometric Function |  | 1 day |
| R/T | Review and Test |  | 2 days  |

**Unit 7: Inferential Statistics**

**Time:** 22 days including optional investigations and activities, 16 days if omit either investigation 3 or 4 and omit investigation 6.

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Inference on Correlation and Regression | IC.A.1, IC.A.2, ID.A.1, ID.A.2, ID.A.3 | 2 days |
| 2 | Collecting and Examining Data | IC.A.1,1C.B.3, IC.B.6,ID.A.1 | 3 days |
| 3 | Inference on Population Proportions\* | IC.A.1, IC.A.2, IC.B.4, IC.B.5 | 4 days |
| 4 | Inference on Population Means\* | IC. A1, IC.A.2, IC.B.4, IC.B.5 | 4 days |
| 5 | Modeling with Data Distributions | IC.A.1, IC.A.2, ID.A.4, MD.A.1 (+), MD.A.2 (+), MD.A.3 (+), MD.A.4 (+) | 4 days |
| 6 | Inferences with Categorical Data (optional) | IC.A.1, IC.A.2 | 2 days |
| PT | Inferential Statistics Project  |  | 1 – 2 days |
| R/T | Review and Test |  | 2 days  |

* You may do investigation 3 or 4 in the interests of time
* For those omitting investigation 3 or 4, much of investigation 5 and investigation 6, no mid-unit test is needed since it is such a short unit and for those classes doing everything a test bank is provided so if desired a mid- term test can be created.

**Unit 8: Matrices**

**Time:** 3 to 18 days. See note that follows.

NOTE on the use of this unit: This unit has been structured so that it will benefit students no matter how much of the unit can be addressed for a particular district.

Investigation 1 as a stand-alone: Students experience matrices as mathematical objects that have well defined operations. Students compare and contrast operations on matrices with operations on real numbers. They also see matrices as having real world utility.

Investigation 2 as a stand-alone: Students visit vectors and vector notation. There is much to be gained by spending time on vectors because too often students do not have facility with vectors and their uses. This investigation ultimately leads to students realizing that a vector can be thought of as a matrix.

Investigations 1 through 3: These three investigations ground students in matrix operations and introduces the notion of a matrix inverse. This is foundational for the utility of matrices as a method of solving large systems of linear equations. If there is only time for the first three investigations, it will be time well spent. It can lead to a much more mature view of mathematical objects and operations and the utility of vectors and matrices.

Investigation 1 through 4: Students who can complete the first four investigations will gain the additional benefit of understanding how to find the inverse of a 2X2 matrix (if it exists) and use the inverse to solve a matrix equation and find the solution to a system of linear equations. This is a major step in mathematical maturity; find a solution to a system of equations without graphing and without algebra.

Investigations 1 through 4 and the first few activities of investigation 5 will have all of the above and adds finding the inverse of a 3 by 3 matrix.

Investigations 1 through 5: Students who can complete the first five investigations will gain the additional benefit of understanding how to find the inverse of a 3X3 matrix (if it exists) and use the inverse to solve a matrix equation and find the solution to a system of equations. They will gain an appreciation of how larger systems can be solved in similar fashion.

The entire unit: Students who complete the entire unit will come to the realization that matrices are very useful objects and understanding matrix operations is a genuine introduction into abstract algebra as well the basic knowledge that these objects may or may not follow the rules that govern operations with real numbers.

Investigation 6 is not required for the unit, but it gives students with a strong background the opportunity to see matrices used to find solutions to interesting problems.

The performance task provided needs investigation 6. Near the end of this document is a suggestion for a task if only investigations 1 – 5 are completed. By checking the end of unit test checklist you can select the problems that assess the investigations you have had time to do with your class. Additional text items can be found in the test bank. Investigation 6 is only assessed by assigning the performance task provided. The example given may be assigned but it is preferred students make up their own context that can be modeled with a stochastic matrix and find the steady state for their context. For uniqueness and existence, make sure the matrix is square and regular (If T has any zero entries a power of T must contain only positive entries.)

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| **Lesson**  | **Title**  | **Standards** | **Time** |
| 1 | Operations with Matrices (+) | N.VM.C 6 – 10(+) | 3 -4 days |
| 2 | Operations with Vectors (+) | N.VM.A1 – 3 (+), N.VM.B.4abc(+), N.VM.B.5ab(+),  | 3 - 4 days |
| 3 | Applications with Vectors and Matrices (+) | N.VM.B.4(+),N.VM.C 9-11(+) | 3 days |
| 4 | Applications with 2x2 Matrices(+) | N.VM.C.6,8.9,12(+) | 3 – 4 days |
| 5 | Applications with n x m Matrices(+) | N.VM.C.6,8,9,12(+) | 3 – 4 days |
| 6 | Applications with Markov Chains and Stochastic Processes (+) optional |  | 3 days |
| PF | Using a Markov Matrix |  | 1 day |
| R/T | Review and test |  | 1 day |