Math 3 Outcomes & Pacing Guide
2017 - 2018

Course Pacing At-A-Glance

82 *days includes time for assessments prior to exams*

Module A: Piecewise Functions	10 days
Module B: Exponential Functions & Inverses of Functions	10 days
Module C: Polynomial Functions	12 days
Module D: Modeling with Geometry	7 days
Module E: Rational Functions	10 days
Module F: Reasoning with Geometry	15 days
Module G: Trigonometric Functions	6 days
Module H: Statistics	6 days
Module I: Advanced Reasoning with Functions	6 days

Module A: Piecewise Functions — 10 days

Outcome 1: I can graph and analyze key features of piecewise functions. — 3 days

a. I can identify and interpret key features of a piecewise function in context given a graph, table, or description.[F-IF.4]
b. I can use function notation to evaluate piecewise functions for a given *x* and interpret what it means in context.[F-IF.2]
c. I can graph a piecewise function to show key features.[F-IF.7]
d. *Honors:* I can build a linear piecewise function.[F-BF]

Outcome 2: I can graph and analyze key features of absolute value functions. — 2 days

a. I can graph an absolute value function to show key features.[F-IF.7]
b. I can identify and interpret key features of an absolute value function in context given a graph, table, or description.[F-IF.4]
c. I can solve absolute value equations and inequalities using graphs and tables.[A-CED.1. A-REI.11]
d. *Honors:* I can graph and identify key features of non-linear absolute value functions.[F-IF.4]

Outcome 3: I can reason algebraically to solve absolute value equations and inequalities. — 3 days

a. I can create absolute value equations and inequalities from context.[A-CED.1,2]
b. I can solve absolute value equations algebraically and justify each step in the solving process.[A-REI.1, A-SSE.1]
c. I can solve absolute value inequalities algebraically and justify each step in the solving process.[A-REI.1, A-SSE.1]
d. I can identify if a solution to an absolute value equation is extraneous.[A-REI.2]
e. *Honors*: I can solve non-linear absolute value equations and inequalities.[A-REI.11]

Module B: Exponential Functions & Inverses of Functions

10 days

Outcome 4: I can use exponential functions to model and solve problems. — 4 days

a. I can create equivalent forms of an exponential function using exponent properties to reveal rates. A-CED.1,2, A-SSE.3c, F-BF.1
b. I can solve exponential equations & inequalities using graphs and tables. A-CED.1, A-REI.11
c. I can rewrite any real number as the power of another real number.[F-LE.4]
d. I can solve exponential equations using logarithms and justify each step in the solving process.[F-LE.4, A-REI.1]
e. *Honors*: I can build and solve exponential equations using *e* and the natural logarithm.

Outcome 5: I can identify and represent the inverse of a function. — 2 days

a. I can create a table and a graph of an inverse given any representation of a function.[F-BF.4a,c]
b. I can determine if an inverse function exists from a graph, table, or equation.[F-BF.4b]
c. I can describe domains of a function where an inverse function exists.[F-BF.4a]
d. *Honors*: I can verify that two functions are inverses by substituting one function into the other and interpreting the result.[F-BF.4a, A-SSE.1b, A-SSE.2]

Outcome 6: I can write the inverse function of a given function. — 3 days

a. I can write the inverse function of a linear function using algebraic reasoning.[F-BF.4c]
b. I can write the inverse function of an exponential function using algebraic reasoning.[F-BF.4c]
c. I can write the inverse function of a quadratic function by restricting the domain and using algebraic reasoning.[F-BF.4c]
d. *Honors*: I can write the inverse of functions in the form $f(x) = ax^3 + c$ and $f(x) = \frac{k}{x} + c$.

Module C: Polynomial Functions

12 days

Outcome 7: I can graph and analyze key features of a polynomial function. — 4 days

a. I can graph a polynomial function, using technology, to show key features.[A.CED.2]
b. I can sketch a graph to show key features of a polynomial function written in factored form.[A.APR.3, F-IF.7]
c. I can identify and interpret key features of a polynomial function in context using graphs and tables.[F-IF.4, 7]
d. I can compare the end behaviors of polynomial and exponential functions.[F-LE.3]
e. *Honors*: I can create a polynomial function from context.[F-BF.1, A-CED.2]

Outcome 8: I can analyze connections between the zeros, factors and graph of a polynomial function. — 4 days

a. I can create a polynomial function (in factored form) from the zeros.[F-BF.1a]
b. I can factor a polynomial function with degree of 3 or less.[A-SSE.2]
c. I can divide a polynomial expression and determine if the divisor is a factor of the expression.[A.APR.2,6]
d. I can evaluate $f(c)$to determine if $(x - c)$is a factor of $f(x)$.[A-APR.2]
e. *Honors*: I can create the polynomial function given the zeros and a point on the graph of the function.

Outcome 9: I can reason with multiple representations to solve polynomial equations. — 3 days

a. I can solve polynomial equations using graphs and tables.[A-CED.1]
b. I can apply the Fundamental Theorem of Algebra to determine the number and potential types of zeros for a polynomial function.[N-CN.9]
c. I can find all solutions to a cubic polynomial equation using a combination of graphs, tables and algebraic reasoning.[A-REI.1, A-REI.11]
d. *Honors*: I can solve polynomial inequalities using graphs and tables. A-CED.1

Module D: Modeling with Geometry — 7 days

Outcome 10: I can use perimeter, area and volume formulas to solve problems. — 3 days

a. I can calculate the volume of a prism, pyramid, cylinder, cone or sphere.[G-GMD.3]
b. I can determine the value of a specific measurement when given the volume of a prism, pyramid, cylinder, cone or sphere and all other necessary measurements.[G-GMD.3]
c. I can describe the two-dimensional cross-sections of three-dimensional objects.[G-GMD.4]
d. I can describe three-dimensional objects generated by rotations of two-dimensional objects.[G-GMD.4]
e. I can decompose a figure into familiar pieces and use them to solve problems involving perimeter, area, and volume.[G-GMD.3, G-MG.1]
f. *Honors:* I can use Cavalieri's Principle to compare the volume of two figures.

Outcome 11: I can apply geometric concepts to solve problems. — 3 days

a. I can calculate the density of an object based on area or volume.[G-MG.1]
b. I can create functions to model relationships within geometric figures.[G-MG.1]
c. I can use geometric and algebraic concepts to solve problems design problems.[G-MG.1]
d. I can use geometric and algebraic concepts to solve optimization problems.[G-MG.1]
e. *Honors*: I can design and describe measurements of a 3D figure that satisfies given constraints.[G-MG.1]

Module E: Rational Functions — 10 days

Outcome 12: I can graph and analyze key features of rational functions. — 3 days

a. I can graph a rational function to show key features.[A-CED.2, F-IF.7]
b. I can identify and interpret key features of rational functions in context using graphs and tables.[F-IF.4,7]
c. I can identify asymptotes and/or points of discontinuity.[F-IF.4,7]
d. I can rewrite a rational expression and use it to determine discontinuities.[A-APR.7, F-IF.4, 7, A-SSE.1]
e. *Honors*: I can predict oblique asymptotes and use polynomial division to determine their equations.

Outcome 13: I can operate with rational expressions. — 3 days

a. I can add or subtract two rational expressions (limited to denominators that are linear expressions).[A-APR.7a]
b. I can multiply two rational expressions.[A-APR.7b]
c. I can divide two rational expressions.[A-APR.7b]
d. *Honors:* I can rewrite rational expressions that involve multiple operations or include more than two rational expressions.[A-APR.7]

Outcome 14: I can build and solve rational equations. — 3 days

a. I can create a rational equation from context.[A-CED.1, 2]
b. I can solve rational equations using graphs and tables.[A-CED.1, A-REI.11]
c. I can solve rational equations algebraically and justify each step in the solving process.[A-REI.1, 2]
d. I can identify extraneous solutions to a rational equation.[A-REI.2]
e. *Honors*: I can explain how extraneous solutions may be produced when solving a rational equation using algebraic reasoning.[A-REI.2]

Module F: Reasoning with Geometry — 15 days

Outcome 15: I can prove properties of parallelograms and apply them in other proofs. — 4 days

a. I can construct a logical argument to prove a theorem about the sides of parallelograms.[G-CO.11]
b. I can construct a logical argument to prove theorems about the angles of different types of parallelograms.[G-CO.11]
c. I can construct a logical argument to prove theorems about the diagonals of different types of parallelograms.[G-CO.11]
d. I can apply theorems about parallelograms to prove given statements and to solve problems. [G-CO.14]
e. *Honors*: I can critique a given proof and revise if necessary.[SMP3]

Outcome 16: I can analyze and apply the relationships between the angles and arcs of a circle. — 3 days

a. I can identify the types of arcs, angles, and line segments associated with a circle.[G-C.2]
b. I can apply the relationship between a central angle and its intercepted arc to solve problems.[G-C.2]
c. I can apply the relationship between an inscribed angle and its intercepted arc to solve problems.[G-C.2]
d. I can apply relationships between angles and arcs to prove geometric theorems and solve problems.[G-CO.14]
e. *Honors*: I can construct a logical argument to prove theorems about angles and their intercepted arcs.

Module F: Reasoning with Geometry *continued*

Outcome 17: I can analyze and apply the relationships between angles and line segments of a circle. — 4 days

a. I can apply the relationship between the perpendicular bisector of a chord and the center of the circle to solve problems.[G-CO.2]
b. I can apply the relationship between congruent chords in a circle to solve problems.[G-C.2]
c. I can apply the relationships between tangent lines and other parts of a circle to solve problems .[G-C.2]
d. I can apply similarity relationships between segments and figures of a circle to solve problems.[G-C.2]
e. *Honors*: I can construct a logical argument to prove theorems about angles and line segments of a circle.[G-CO.14]

Outcome 18: I can analyze and apply proportional relationships between angles, arcs and sectors of a circle to solve problems. — 3 days

a. I can determine the arc length of an arc intercepted by an inscribed or central angle.[G-C.5]
b. I can determine the area of a sector.[G-C.5]
c. I can apply arc length and area of sectors to solve problems of unknown length and area.[G-C.5, G-CO.14]
d. I can apply the proportional relationship between the intercepted arc, radius, and radian measure of an angle in a circle to solve problems.[G-C.5]
e. *Honors*: I can determine the perimeter or area of a geometric figure composed of circles, triangles and/or parallelograms.[G-C.5]

Module G: Trigonometric Functions

6 days

Outcome 19: I can represent and identify points on a circle in the coordinate plane.

3 days

a. I can write the equation of a circle given its center and radius.[G-GPE.1]
b. I can rewrite the equation of a circle to identify its center and radius. [G-GPE.1, A-SSE.1]
c. I can use sine and cosine ratios to determine the coordinates of any point on a circle given the radius of one unit and angle of rotation. [F-TF.2]
d. *Honors*: I can use sine and cosine ratios to determine the coordinates of any point on a circle given the radius and angle of rotation. [F-TF.2]

Outcome 20: I can use trigonometric functions to model and solve problems.

3 days

a. I can graph sine and cosine functions and identify key features including period, amplitude, and midline. [F-IF.4, F-IF.7]
b. I can use the sine function to model patterns of periodic change. [F-TF.5]
c. I can interpret key features of a sine function in context given a graph, table, or description.[F-TF.5, F-IF.4]
d. *Honors:* I can use the cosine function to model patterns of periodic change.[F-TF]

Module H: Statistics

6 days

Outcome 21: I can use statistical reasoning to draw conclusions from experiments and studies.

a. I can distinguish between, justify the use of, and recognize the limitations of sample surveys, experiments, and observational studies. [S-IC.1, 3]
b. I can describe a method for selecting a random sample to represent a population.[S-IC.1]
c. I can use data from a sample survey to estimate the true population mean or proportion, with a margin of error. [S-IC.1, 3, 4]
d. I can determine if results from an experiment are statistically significant and justify appropriate conclusions. [S-IC.3, 5]
e. I can use statistical reasoning to evaluate reports based on data. [S-IC.6]
f. *Honors:* I can create and answer a statistical question using the four steps of the statistical process.[S-IC]

Module I: Advanced Reasoning with Functions

6 days

Outcome 22: I can solve systems of equations or inequalities and interpret the solution in the context.

2 days

a. I can compare key features of two functions each with a different representation.[F-IF.9]
b. I can create a system of equations and/or inequalities to model a situation in context.[A-CED.3]
c. I can solve systems containing any two function types graphically with the use of technology.[A-REI.11]
d. I can graph the solution set to a system of inequalities containing at least two functions.[A-CED.2, 3]
e. I can identify values in the solution set and describe solution(s) in the context of a situation. [A-CED.3]
f. *Honors*: I can solve a system algebraically containing a quadratic and the equation of a circle.[A-REI.1]

Outcome 23: I can apply transformations to build new functions.

3 days

a. I can compare functions within a family and describe the transformations from one to the other.[F-BF.3]
b. I can describe the effect on the graph and table of a function given a transformation of the function in symbolic form.[F-BF.3]
c. I can create a graph, table of values, or equation of a new function given a function and a transformation or series of transformations.[F-BF.3]
d. I can combine standard function types to build a function that models a relationship between two quantities. [F-BF.1]
e. *Honors*: I can build a piecewise function using transformations and at least two different function types.[F-BF.1]