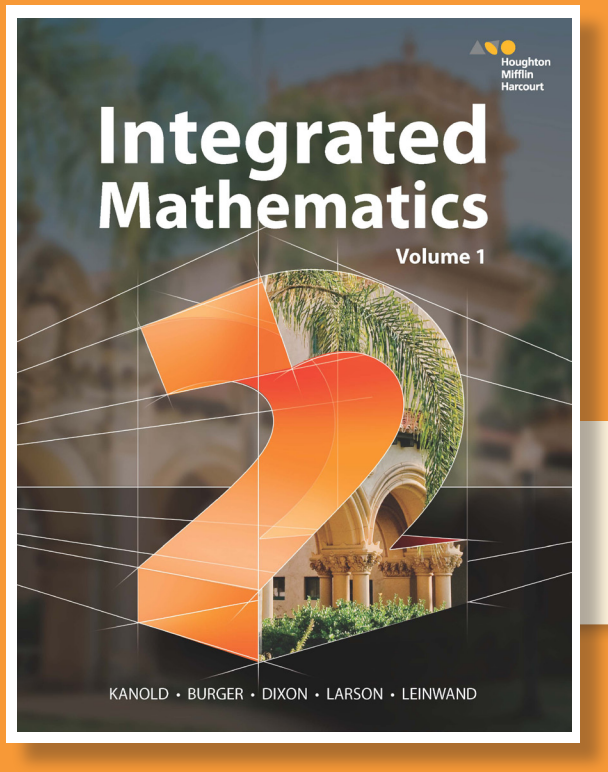
Houghton Mifflin Harcourt



Correlation to the

Common Core State Standards for Integrated Mathematics Mathematics 2

Houghton Mifflin Harcourt
Intergrated Math 2 ©2015

Houghton Mifflin Harcourt
***Integrated Math II* ©2015**

correlated to the

Common Core State Standards for Mathematics
Mathematics II

Standards	Descriptor	Citations
Standards for Mathematical Practice		
SMP.1	Make sense of problems and persevere in solving them.	*Integrated throughout the book. Examples:* SE: 16, 44, 53–54, 75–76, 84, 106, 135, 159, 172, 293
SMP.2	Reason abstractly and quantitatively.	*Integrated throughout the book. Examples:* SE: 10, 69, 92, 109, 128, 223, 251, 293, 365, 379, 409
SMP.3	Construct viable arguments and critique the reasoning of others.	*Integrated throughout the book. Examples:* SE: 14, 29, 59, 68, 82, 105, 109, 115, 119, 137, 193, 409
SMP.4	Model with mathematics.	*Integrated throughout the book. Examples:* SE: 10–11, 20–22, 28, 34–36, 53–54, 143, 154, 162, 192–193
SMP.5	Use appropriate tools strategically.	*Integrated throughout the book. Examples:* SE: 20–22, 139–140, 151–152, 169–170, 239–240, 263–264, 644–645, 697, 721, 779–780
SMP.6	Attend to precision.	*Integrated throughout the book. Examples:* SE: 42, 75–76, 86, 383–384, 474–477, 483, 488
SMP.7	Look for and make use of structure.	*Integrated throughout the book. Examples:* SE: 28, 41, 139–140, 169–170, 273, 445, 707, 712–713, 738
SMP.8	Look for and express regularity in repeated reasoning.	*Integrated throughout the book. Examples:* SE: 5, 30, 41, 97, 273, 445, 617, 618, 707, 712–713, 738

Standards	Descriptor	Citations
Standards for Mathematical Content		
N-RN	**The Real Number System**	
Extend the properties of exponents to rational exponents.		
N-RN.A.1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	SE: 97–106
N-RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents	SE: 97–106, 107–120
Use Properties of Rational and Irrational Numbers		
N-RN.B.3	Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	SE: 107–120
N-CN	**The Complex Number System**	
Perform arithmetic operations with complex numbers.		
N-CN.A.1	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	SE: 521–534, 535–546
N-CN.A.2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	SE: 535–546, 547–560
Use Complex Numbers in polynomial identities and equations		
N-CN.C.7	Solve quadratic equations with real coefficients that have complex solutions.	SE: 547–560
N-CN.C.8	(+) Extend polynomial identities to the complex numbers.	SE: 535–546

Standards	Descriptor	Citations
N-CN.C.9	(+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	SE: 547–560
A-SSE	**Seeing Structure in Expressions**	
Interpret the structure of expressions		
A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.	SE: 107–120, 127–138, 139–150, 151–162, 169–176, 177–188, 189–198
A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.	SE: 127–138
A-SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.	SE: 107–120, 127–138
A-SSE.A.2	Use the structure of an expression to identify ways to rewrite it.	SE: 127–138, 273–282, 283–294, 307–318, 319–330, 331–348, 367–380
Write expressions in equivalent forms to solve problems		
A-SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.★	SE: 283–294, 307–318, 319–330, 331–348, 367–380
A-SSE.B.3a	Factor a quadratic expression to reveal the zeros of the function it defines.	SE: 307–318, 319–330, 331–348, 367–380
A-SSE.B.3b	Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	SE: 367–380
A-SSE.B.3c	Use the properties of exponents to transform expressions for exponential functions.	SE: 97–106, 107–120, 445–458, 459–472

Standards	Descriptor	Citations
A-APR	**Arithmetic with polynomials and rational expressions**	
Perform arithmetic operations on polynomials		
A-APR.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	SE: 127–138, 139–150, 151–162, 169–176, 177–188, 189–198, 273–282
A-CED	**Creating Equations**	
Create equations that describe numbers of relationships		
A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	SE: 61–70, 71–84, 127–138, 139–150, 151–162, 169–176, 177–188, 189–198
A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	SE: 5–16, 17–30, 49–60, 473–488
A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	SE: 629–640
A-REI	**Reasoning with Equations and Inequalities**	
Solve equations and inequalities in one variable		
A-REI.B.4	Solve quadratic equations in one variable.	SE: 259–272, 283–294, 307–318, 319–330, 331–348, 355–366, 367–380, 381–394, 395–410, 521–534, 547–560
A-REI.B.4a	Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	SE: 367–380, 381–394

Standards	Descriptor	Citations
A-REI.B.4b	Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	SE: 307–318, 319–330, 331–348, 355–366, 367–380, 381–394, 395–410, 521–534, 547–560
Solve systems of equations.		
A-REI.C.7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	SE: 411–422, 597–610
F-IF	**Interpreting Functions**	
Interpret functions that arise in applications in terms of the context.		
F-IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ⋆	SE: 17–30, 49–60, 211–224, 225–238, 239–252, 473–488
F-IF.B.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.⋆	SE: 5–16, 459–472, 473–488, 629–640
F-IF.B.6	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ⋆	SE: 17–30, 489–508

Standards	Descriptor	Citations
Analyze functions using different representations.		
F-IF.C.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*	SE: 49–60, 71–84, 211–224, 259–272, 273–282, 445–458, 459–472, 617–628, 641–652, 653–664
F-IF.C.7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.	SE: 211–224, 259–272
F-IF.C.7b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	SE: 49–60, 71–84, 641–652, 653–664
F-IF.C.7e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	SE: 445–458, 459–472
F-IF.C.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	SE: 239–252, 367–380, 445–458
F-IF.C.8a	Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	SE: 367–380
F-IF.C.8b	Use the properties of exponents to interpret expressions for exponential functions.	SE: 445–458
F-IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	SE: 489–508

Standards	Descriptor	Citations
F-BF	**Building Functions**	
Build a function that models a relationship between two quantities		
F-BF.A.1	Write a function that describes a relationship between two quantities.⋆	SE: 225–238, 239–252, 459–472
F-BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.	SE: 459–472
F-BF.A.1b	Combine standard function types using arithmetic operations.	SE: 139–150, 151–162, 169–176, 177–188, 225–238, 283–294
Build new functions from existing functions		
F-BF.B.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	SE: 49–60, 211–224, 225–238, 617–628, 641–652, 653–664
F-BF.B.4	Find inverse functions.	SE: 31–42, 225–238, 629–640, 641–652, 653–664
F-BF.B.4a	Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.	SE: 629–640, 641–652, 653–664
F-LE	**Linear, Quadratic, and Exponential Models**	
Construct and compare linear, quadratic, and exponential models and solve problems.		
F-LE.A.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	SE: 489–508

Standards	Descriptor	Citations
F-TF	**Trigonometric Functions**	
Prove and apply trigonometric identities.		
F-TF.C.8	Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant.	SE: 981–992
G-CO	**Congruence**	
Prove geometric theorems.		
G-CO.C.9	Prove theorems about lines and angles.	SE: 677–688, 689–698, 699–708, 709–718
G-CO.C.10	Prove theorems about triangles.	SE: 725–738, 765–776, 777–786, 881–890
G-CO.C.11	Prove theorems about parallelograms.	SE: 787–800, 801–812
G-SRT	**Similarity, Right Triangles, and Trigonometry**	
Understand similarity in terms of similarity transformations.		
G-SRT.A.1	Verify experimentally the properties of dilations given by a center and a scale factor:	SE: 827–836
G-SRT.A.1a	A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.	SE: 827–836
G-SRT.A.1b	The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	SE: 827–836
G-SRT.A.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	SE: 837–850, 851–860
G-SRT.A.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	SE: 861–872

Standards	Descriptor	Citations
Prove theorems involving similarity.		
G-SRT.B.4	Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*	SE: 881–890, 913–924
G-SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	SE: 787–800, 801–812, 861–872, 881–890, 903–912, 913–924
Define trigonometric ratios and solve problems involving right triangles.		
G-SRT.C.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	SE: 931–940, 941–952
G-SRT.C.7	Explain and use the relationship between the sine and cosine of complementary angles.	SE: 941–952
G-SRT.C.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★	SE: 931–940, 941–952, 953–966, 967–980
G-C	**Circles**	
Understand and apply theorems about circles.		
G-C.A.1	Prove that all circles are similar.	SE: 837–850, 1089–1098
G-C.A.2	Identify and describe relationships among inscribed angles, radii, and chords.	SE: 1005–1018, 1031–1040, 1041–1054, 1055–1068
G-C.A.3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	SE: 1019–1030
G-C.A.4	(+) Construct a tangent line from a point outside a given circle to the circle.	SE: 1031–1040

Standards	Descriptor	Citations
Find arc lengths and areas of sectors of circles.		
G-C.B.5	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	SE: 1089–1098, 1099–1108
G-GPE	**Expressing Geometric Properties with Equations**	
Translate between the geometric description and the equation for a conic section.		
G-GPE.A.1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	SE: 567–582
G-GPE.A.2	Use coordinates to prove simple geometric theorems algebraically	SE: 765–776, 777–786
Use coordinates to prove simple geometric theorems algebraically.		
G-GPE.B.4	Use coordinates to prove simple geometric theorems algebraically	SE: 765–776, 777–786
G-GPE.B.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	SE: 891–902
G-GMD	**Geometric Measurement and Dimension**	
Explain volume formulas and use them to solve problems.		
G-GMD.A.1	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.	SE: 1077–1088, 1089–1098, 1121–1132, 1133–1144, 1145–1158
G-GMD.A.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★	SE: 1121–1132, 1133–1144, 1145–1158, 1159–1170

Standards	Descriptor	Citations
S-ID	**Interpreting Categorical and Quantitative Data**	
Summarize, represent, and interpret data on two categorical and quantitative variables		
S-ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	SE: 429–444
S-ID.B.6b	Informally assess the fit of a function by plotting and analyzing residuals.	SE: 429–444
S-CP	**Conditional Probability and the rules of probability**	
Understand independence and conditional probability and use them to interpret data.		
S-CP.A.1	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	SE: 1193–1204
S-CP.A.2	Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	SE: 1259–1274
S-CP.A.3	Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.	SE: 1247–1258, 1259–1274, 1275–1286
S-CP.A.4	Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.	SE: 1229–1240, 1247–1258, 1259–1274, 1275–1286, 1303–1314

Standards	Descriptor	Citations
S-CP.A.5	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	SE: 1247–1258, 1259–1274, 1275–1286, 1303–1314
Use the rules of probability to compute probabilities of compound events in a uniform probability model.		
S-CP.B.6	Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.	SE: 1247–1258
S-CP.B.7	Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.	SE: 1229–1240
S-CP.B.8	(+) Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B\|A) = P(B)P(A\|B)$, and interpret the answer in terms of the model.	SE: 1275–1286
S-CP.B.9	(+) Use permutations and combinations to compute probabilities of compound events and solve problems.	SE: 1205–1216, 1217–1228
S-MD	**Using Probability to Make Decisions**	
Use probability to evaluate outcomes of decisions.		
S-MD.B.6	(+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	SE: 1293–1302
S-MD.B.7	(+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	SE: 1303–1314