



**MathConnections Year 1 Correlation to the Georgia Performance Standards,
Grade 9-12**

MATHEMATICS 3

ALGEBRA

Students will investigate exponential, logarithmic and polynomial functions of degree higher than 2. Students will understand matrices and use them to solve problems.

Standard	Location/Page where Standard is found
MM3A1. Students will analyze graphs of polynomial functions of higher degree.	
a. Graph simple polynomial functions as translations of the function $f(x) = ax^n$.	Book 3a: pp. 30 – 36
b. Understand the effects of the following on the graph of a polynomial function: degree, lead coefficient, and multiplicity of real zeros.	Book 3a: pp. 38 – 47
c. Determine whether a polynomial function has symmetry and whether it is even, odd, or neither.	Book 3a: pp. 26 – 28, 40 – 41
d. Investigate and explain characteristics of polynomial functions, including domain and range, intercepts, zeros, relative and absolute extrema, intervals of increase and decrease, and end behavior.	Book 3a: pp. 5, 10, 13, 15 – 29, 36, 38, 39, 44 – 47
MM3A2. Students will explore logarithmic functions as inverses of exponential functions.	
a. Find real and complex roots of higher degree polynomial equations using the factor theorem, remainder theorem, rational root theorem, and fundamental theorem of algebra, incorporating complex and radical conjugates.	Not presented

b. Solve polynomial, exponential, and logarithmic equations analytically, graphically, and using appropriate technology.	Book 3a: pp. 3 – 47, 84 – 140
c. Solve polynomial, exponential, and logarithmic inequalities analytically, graphically, and using appropriate technology. Represent solution sets of inequalities using interval notation.	Book 3a: pp. 3 – 47, 84 – 140
d. Solve a variety of types of equations by appropriate means choosing among mental calculation, pencil and paper, or appropriate technology.	Book 1a: 121 – 129 Book 1b: 292, 387 – 398 Book 3a: pp. 87 – 109, 120 – 140
MM3A4. Students will perform basic operations with matrices.	
a. Add, subtract, multiply, and invert matrices, when possible, choosing appropriate methods, including technology.	Book 2b: pp. 524 – 542
b. Find the inverses of two-by-two matrices using pencil and paper, and find inverses of larger matrices using technology.	Not presented
c. Examine the properties of matrices, contrasting them with properties of real numbers.	Book 2b: pp. 526 – 538
MM3A5. Students will use matrices to formulate and solve problems.	
a. Represent a system of linear equations as a matrix equation.	Book 2b: pp. 511 – 523
b. Solve matrix equations using inverse matrices.	Not presented
c. Represent and solve realistic problems using systems of linear equations.	Book 2b: pp. 500 – 523 Book 3b: pp. 316 – 357
MM3A6. Students will solve linear programming problems in two variables.	
a. Solve systems of inequalities in two variables, showing the solutions graphically.	Book 1b: pp. 288 – 321 Book 2b: pp. 481 – 484, 491 – 492, 498 Book 3b: pp. 316 – 357
b. Represent and solve realistic problems using linear programming.	Book 3b: pp. 316 – 357

MM3A7. Students will understand and apply matrix representations of vertex-edge graphs.

a. Use graphs to represent realistic situations.

Book 3b: pp. 316 – 357

b. Use matrices to represent graphs, and solve problems that can be represented by graphs.

Book 2b: 500 – 523

GEOMETRY

Students will understand and use the analytic geometry of conic sections and of planes and spheres in space.

Standard	Location/Page where Standard is found
MM3G1. Students will investigate the relationships between lines and circles.	
a. Find equations of circles.	Book 2b: pp. 312 – 322
b. Graph a circle given an equation in general form.	Not presented
c. Find the equation of a tangent line to a circle at a given point.	Not presented
d. Solve a system of equations involving a circle and a line.	pp. 163, 167
e. Solve a system of equations involving two circles.	
MM3G2. Students will recognize, analyze, and graph the equations of the conic sections (parabolas, circles, ellipses, and hyperbolas).	
a. Convert equations of conics by completing the square.	Book 3a: pp. 19 – 22
b. Graph conic sections, identifying fundamental characteristics.	Book 2b: pp. 312 – 322 Book 3a: pp. 30 – 36
c. Write equations of conic sections given appropriate information.	Book 2b: pp. 314 – 322 Book 3a pp. 32 – 36
MM3G3. Students will investigate planes and spheres.	
a. Plot the point (x, y, z) and understand it as a vertex of a rectangular prism.	Book 2b: pp. 443 – 461

b. Apply the distance formula in 3-space.	Book 2b: pp. 464 – 467
c. Recognize and understand equations of planes and spheres.	Book 2b: pp. 450 – 467

DATA ANALYSIS AND PROBABILITY

Students will use a normal distribution to calculate probabilities. They will organize, represent, investigate, interpret, and make inferences using data from both observational studies and experiments.

Standard	Location/Page where Standard is found
MM3D1. Students will create probability histograms of discrete random variables, using both experimental and theoretical probabilities.	Book 1b: pp. 489 – 492 Book 3a: pp. 358 – 362
MM3D2. Students will solve problems involving probabilities by interpreting a normal distribution as a probability histogram for a continuous random variable (z-scores are used for a general normal distribution).	
a. Determine intervals about the mean that include a given percent of data.	Book 3a: pp. 280 – 295
b. Determine the probability that a given value falls within a specified interval.	Book 3a: pp. 278, 279
c. Estimate how many items in a population fall within a specified interval.	Book 3a: 292, 295
MM3D3. Students will understand the differences between experimental and observational studies by posing questions and collecting, analyzing, and interpreting data.	Book 1b: 489 – 492

PROCESS STANDARDS

The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.

Standard	Location/Page where Standard is found
MM2P1. Students will solve problems (using appropriate technology).	
a. Build new mathematical knowledge through problem solving.	Book 1a: pp. 97, 121 – 123, 140, 144 Book 1b: pp. 276 – 278, 460 Book 2a: pp. 72, 224, 228 Book 2b: pp. 314 – 320, 324 – 332, 341 – 346, 352 – 356, 373 – 377, 390 – 392, 427, 428, 431 Book 3a: pp. 45, 46, 88, 104, 123, 205 – 209, 214 Book 3b: pp. 451, 454 – 457, 501 – 501
b. Solve problems that arise in mathematics and in other contexts.	Book 1a: pp. 49 – 52, 70 – 73, 78, 83 – 86, 93, 94, 129, 139, 151 – 157, 206 – 210, 213- 216, 222 – 226, 252 – 256, Book 1b: pp. 295, 296, 313 – 316, 319, 325, 326, 376, Book 2a: pp. 4 – 6, 14, 22, 94 – 98, 154 – 156, 166, 174 – 177, 187 – 189, 225, 235, 236 Book 2b: pp. 284 – 286, 293, 395, 398, 468 – 477, 509 Book 3a: pp. 89, 99, 100, 127 – 130, 187, 217, 262, 572 Book 3b: pp. 316 – 357, 426 – 428, 434, 435, 549, 550, 553, 597

<p>c. Apply and adapt a variety of appropriate strategies to solve problems.</p>	<p>Book 1a: pp. 15, 123, 136, 138, 144, 184 – 191 Book 1b: pp. 276 – 278, 308 – 310, 320 – 321, 460 Book 2a: pp. 224, 228 Book 2b: pp. 314 – 320, 324 – 332, 341 – 346, 352 – 356, 373 – 377, 390 – 392, 427, 428, 431 Book 3a: pp. 109, 113 – 118, 148, 149, 163 – 179 Book 3b: pp. 454 – 457, 604</p>
<p>d. Monitor and reflect on the process of mathematical problem solving.</p>	<p>Book 1a: pp. 44, 97, 103, 124, 132, 173 Book 1b: pp. 460 Book 2a: pp. 77, 130, 144, 145, 182, 183, 189, 191 – 197, 201, 228, 229, 251 – 253 Book 2b: pp. 405, 417 Book 3a: pp. 13, 15, 24, 57, 58, 83, 91, 92, 108, 133, 215 Book 3b: pp. 333</p>
<p>MM2P2. Students will reason and evaluate mathematical arguments.</p>	
<p>a. Recognize reasoning and proof as fundamental aspects of mathematics.</p>	<p>Book 1a: pp. 97, 103, 123, 177 Book 2a: pp. 26, 31, 35, 40 – 42, 53, 68, 132, 157, 182, 183, 186, 189, 192, 193, 199, 228, 229, 237 – 239 Book 3a: pp. 80, 88, 91 Book 3b: pp. 389, 391 – 394, 417 – 423, 436, 445, 452, 461, 462, 466, 477, 479, 483 – 487, 497, 498, 512, 523, 540, 547, 548, 552, 572 – 581, 600 – 602</p>
<p>b. Make and investigate mathematical conjectures.</p>	<p>Book 1a: pp. 15, 123, 136, 138, 144, 184 – 191 Book 1b: pp. 276 – 278, 308 – 310, 320 – 321, 460 Book 2a: pp. 224, 228 Book 2b: pp. 314 – 320, 324 – 332, 341 – 346, 352 – 356, 373 – 377, 390 – 392, 427, 428, 431 Book 3a: pp. 109, 113 – 118, 148, 149, 163 – 179 Book 3b: pp. 454 – 457, 604</p>

c. Develop and evaluate mathematical arguments and proofs.	Book 1a: pp. 97, 103, 123, 177 Book 2a: pp. 26, 31, 35, 40 – 42, 53, 68, 132, 157, 182, 183, 186, 189, 192, 193, 199, 228, 229, 237 – 239 Book 3a: pp. 80, 88, 91 Book 3b: pp. 389, 391 – 394, 417 – 423, 436, 445, 452, 461, 462, 466, 477, 479, 483 – 487, 497, 498, 512, 523, 540, 547, 548, 552, 572 – 581, 600 – 602
d. Select and use various types of reasoning and methods of proof.	Book 1a: pp. 97, 103, 123, 177 Book 2a: pp. 26, 31, 35, 40 – 42, 53, 68, 132, 157, 182, 183, 186, 189, 192, 193, 199, 228, 229, 237 – 239 Book 3a: pp. 80, 88, 91 Book 3b: pp. 389, 391 – 394, 417 – 423, 436, 445, 452, 461, 462, 466, 477, 479, 483 – 487, 497, 498, 512, 523, 540, 547, 548, 552, 572 – 581, 600 – 602
MM2P3. Students will communicate mathematically.	
a. Organize and consolidate their mathematical thinking through communication.	Book 1a: pp. 4, 17, 30, 63, 70 – 73, 137, 173, 219 – 221 Book 1b: pp. 276, 281, 283, 285, 286, 318, 347, 460 Book 2a: pp. 72, 228 Book 3a: pp. 26, 51 Book 3b: pp. 588 – 590
b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	Book 1a: pp. 4, 17, 30, 40, 44, 48, 61, 63, 70 – 73, 83, 101, 108, 126, 137, 167, 180, 207, 210, 245, 263, 264, 271 Book 1b: pp. 282, 295 – 297, 350, 410, 387, 400, 408 – 410, 460, 463, 466 Book 2a: pp. 72, 120, 126, 186, 204 Book 2b: pp. 284, 476 Book 3a: pp. 42, 96, 116, 117, 122, 135, 144, 261 Book 3b: pp. 388, 399, 490, 538, 550, 593, 602
c. Analyze and evaluate the mathematical thinking and strategies of others.	Book 1b: pp. 275 – 277

<p>d. Use the language of mathematics to express mathematical ideas precisely.</p>	<p>Book 1a: pp. 4, 17, 30, 40, 44, 48, 61, 63, 70 – 73, 83, 101, 108, 126, 137, 167, 180, 207, 210, 245, 263, 264, 271 Book 1b: pp. 282, 295 – 297, 350, 410, 387, 400, 408 – 410, 460, 463, 466 Book 2a: pp. 72, 120, 126, 186, 204 Book 2b: pp. 284, 476 Book 3a: pp. 42, 96, 116, 117, 122, 135, 144, 261 Book 3b: pp. 388, 399, 490, 538, 550, 593, 602</p>
<p>MM2P4. Students will make connections among mathematical ideas and to other disciplines.</p>	
<p>a. Recognize and use connections among mathematical ideas.</p>	<p>Book 1a: pp. 128, 170 Book 1b: pp. 356, 357, 422 Book 2a: pp. 25, 55 – 65, 71, 72, 88, 100 – 103, 145, 149, 168, 169, 174, 175, 180 – 182, 216, 221 Book 2b: pp. 313 – 322, 373 – 377, 397 – 400, 404, 406 – 421, 442 – 476, 486 – 492 Book 3a: pp. 37 – 39 Book 3b: pp. 371 – 382, 454 – 457, 462, 472, 494, 500 – 504, 508, 522 – 523, 532</p>
<p>b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.</p>	<p>Book 1a: pp. 128, 170 Book 1b: pp. 356, 357, 422 Book 2a: pp. 25, 55 – 65, 71, 72, 88, 100 – 103, 145, 149, 168, 169, 174, 175, 180 – 182, 216, 221 Book 2b: pp. 313 – 322, 373 – 377, 397 – 400, 404, 406 – 421, 442 – 476, 486 – 492 Book 3a: pp. 37 – 39 Book 3b: pp. 371 – 382, 454 – 457, 462, 472, 494, 500 – 504, 508, 522 – 523, 532</p>

<p>c. Recognize and apply mathematics in contexts outside of mathematics.</p>	<p>Book 1a: pp. 49 – 52, 70 – 73, 78, 83 – 86, 93, 94, 129, 139, 151 – 157, 206 – 210, 213- 216, 222 – 226, 252 – 256, Book 1b: pp. 295, 296, 313 – 316, 319, 325, 326, 376, Book 2a: pp. 4 – 6, 14, 22, 94 – 98, 154 – 156, 166, 174 –177, 187 – 189, 225, 235, 236 Book 2b: pp. 284 – 286, 293, 395, 398, 468 – 477, 509 Book 3a: pp. 89, 99, 100, 127 – 130, 187, 217, 262, 572 Book 3b: pp. 316 – 357, 426 – 428, 434, 435, 549, 550, 553, 597</p>
<p>MM2P5. Students will represent mathematics in multiple ways.</p>	
<p>a. Create and use representations to organize, record, and communicate mathematical ideas.</p>	<p>Book 1a: pp. 8 –11, 16 – 53, 60, 70 – 73, 176 – 210, 219 – 271 Book 1b: pp. 276 – 280, 288 – 328, 356 – 386, 424 – 450, 473, 476, 489 - 492 Book 2a: pp. 62 – 65, 72, 94, 101 – 102, 127, 136, 150, 180 – 182, 187, 271 – 280 Book 2b: pp. 309 – 314, 318, 319, 328, 438 – 467, 472 – 478, 494 – 499 Book 3a: pp. 37 – 38, 163 – 174 Book 3b: pp. 389 – 393, 494, 500 – 504, 432, 433, 458, 500 – 501, 589, 590</p>
<p>b. Select, apply, and translate among mathematical representations to solve problems.</p>	<p>Book 1a: pp. 14, 23, 87, 88, 172 – 173, 219 – 221 Book 1b: pp. 307 – 310, 320, 321, 350, 351, Book 2a: pp. 44, 69, 108, 221, 237 – 239 Book 2b: pp. 370 Book 3a: pp. 66 , 79, 81, 98, 106, 122, 237 Book 3b: pp. 334 – 338, 350, 361</p>

c. Use representations to model and interpret physical, social, and mathematical phenomena.

Book 1a: pp. 49 – 52, 70 – 73, 78, 83 – 86, 93, 94, 129, 139, 151 – 157, 206 – 210, 213- 216, 222 – 226, 252 – 256,
Book 1b: pp. 295, 296, 313 – 316, 319, 325, 326, 376,
Book 2a: pp. 4 – 6, 14, 22, 94 – 98, 154 – 156, 166, 174 –177, 187 – 189, 225, 235, 236
Book 2b: pp. 284 – 286, 293, 395, 398, 468 – 477, 509
Book 3a: pp. 89, 99, 100, 127 – 130, 187, 217, 262, 572
Book 3b: pp. 316 – 357, 426 – 428, 434, 435, 549, 550, 553, 597

READING STANDARD

Standard	Location/Page where Standard is found
S8CS10. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas <ul style="list-style-type: none"> ∞ Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas ∞ Read both informational and fictional texts in a variety of genres and modes of discourse ∞ Read technical texts related to various subject areas. 	All sections, all texts
b. Discussing books <ul style="list-style-type: none"> ∞ Discuss messages and themes from books in all subject areas. ∞ Respond to a variety of texts in multiple modes of discourse. ∞ Relate messages and themes from one subject area to messages and themes in another area. ∞ Evaluate the merit of texts in every subject discipline. ∞ Examine author’s purpose in writing. ∞ Recognize the features of disciplinary texts. 	All sections, all texts
c. Building vocabulary knowledge <ul style="list-style-type: none"> ∞ Demonstrate an understanding of contextual vocabulary in various subjects. ∞ Use content vocabulary in writing and speaking. ∞ Explore understanding of new words found in subject area texts. 	Book 1a: p. 6, 34, 58, 64 – 65, 78, 85, 110 – 111 Book 1b: pp. 330 – 332, 347 – 348, 367 Book 2a: 9, 15,19, 24 – 25, 32, 36 – 38, 56, 91 – 95, 108, 113 – 114, 157 – 161, 166 Book 2b: 283 – 292, 339- 340, 347, 352 – 353, 369, 379 – 380, 383 – 386, 398, 429 – 430 Book 3a: 5 – 6, 14, 23 – 24, 39, 110 – 112, 135, 147, 153 – 159 Book 3b: pp. 317 – 320, 335 – 337, 362 – 365, 388 – 391, 395 – 398, 400 – 405, 410, 417 – 419, 431 – 432, 437 – 440, 464, 488 – 489, 546 – 547, 583 – 586, 591

<p>d. Establishing context</p> <ul style="list-style-type: none"> ∞ Explore life experiences related to subject area content. ∞ Discuss in both writing and speaking how certain words are subject area related ∞ Determine strategies for finding content and contextual meaning for unknown words. 	<p>Book 1a: pp. 2, 4 – 11, 17, 26 – 32, 39 – 52, 70 – 73, 78, 79, 83 – 96, 102 – 104, 117 – 129, 139, 146, 151 – 161, 170 - 175, 193 – 194, 200 – 202, 206 – 210, 213 – 216, 219 – 245, 251 – 271</p> <p>Book 1b: pp. 281 – 299, 307 – 319, 325, 326, 329 – 347, 353, 354, 360 – 378, 380 – 400, 403 – 410, 413 – 419, 424 – 429, 431, 432, 435, 436, 444 – 460,</p> <p>Book 2a: pp. 2, 16, 22, 43, 52, 135, 136, 153 – 156, 174, 175, 198, 199, 202, 207 – 210, 212, 217, 231, 252</p> <p>Book 2b: pp. 283 – 286, 294, 305 – 307, 309 – 311, 323, 336, 338, 340 – 350, 355, 356, 375 – 381, 383, 390, 395, 396, 398, 407, 418, 421, 425 – 429, 435 – 437, 439, 445, 468 – 476, 482 – 485, 491, 491, 500, 501, 509 – 513, 520 – 525, 528 – 530, 532 – 535, 539 – 541</p> <p>Book 3a: pp. 3 – 18, 24 , 25, 29, 35 – 44, 47 – 49, 53 – 57, 61 – 63, 66, 84 – 107, 131 – 151, 191 – 195, 205 – 209, 212, 217 –218, 234, 251 – 252, 257, 262, 282, 283, 286 – 295</p> <p>Book 3b: pp. 307 – 334, 341 – 350, 361, 376, 381, 382, 426</p>
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