



MISSOURI
Mathematics Grade-Level Expectations Grades 9, 10
Algebra 1 © 2005

OBJECTIVES	PAGE REFERENCES
GRADE 9	
Number and Operations	
1. Understand numbers, ways of representing numbers, relationships among numbers and number systems	
A. Read, write and compare numbers	
compare and order rational and irrational numbers, including finding their approximate locations on a number line MA 5 3.3 IX.a	SE: 68-72, 73-78, 83 #63-#65, 103-109, 134 #71-#73, 170 #52-#53 TWE: OEA 72
B. Represent and use rational numbers	
C. Compose and decompose numbers	
D. Classify and describe numeric relationships	
2. Understand meanings of operations and how they relate to one another	
A. Represent operations	
B. Describe effects of operations	
describe the effects of operations, such as multiplication, division, and computing powers and roots on the magnitude of quantities MA 4 3.4,4.1 VIII.i	SE: 6-9, 73-78, 79-83, 84-87, 103-109, 256-262, 264-270, 410-415, 417-423 <i>Graphing Calculator Investigation 265</i>
C. Apply properties of operations	
apply properties of exponents (including order of operations) to simplify expressions MA 4 1.6,1.10 VIII.c & d	SE: 11-15, 410-415, 417-423, 425-430, 444-448 <i>Algebra Activity 416</i> <i>Graphing Calculator Investigation 418</i> TWE: DI 412
D. Apply operations on real and complex numbers	
apply operations to real numbers, using mental computation or paper-and-pencil calculations for simple cases and technology for more complicated cases MA 1,4,5 1.4,3.4 V.a, VIII.d, IX.6	SE: 11-15, 73-78, 79-83, 84-87, 103-109, 135-140, 142-147, 425-430, 623-630 <i>Graphing Calculator Investigation 148 #59-#64</i>
3. Compute fluently and make reasonable estimates	
A. Describe or represent mental strategies	
B. Develop and demonstrate fluency	
C. Compute problems	
apply all operations on real numbers MA 5 1.10,3.3 IX.a	SE: 11-15, 73-78, 79-83, 84-87, 103-109, 128-134, 135-140, 142-148, 586-592, 593-597

OBJECTIVES	PAGE REFERENCES
D. Estimate and justify solutions	
judge the reasonableness of numerical computations and their results MA 1 3.8 V.a	SE: 75 Ex 3, 121 Ex 2, 157 Ex 4, 371 Ex 3 <i>Algebra Activity 347</i>
E. Use proportional reasoning	
solve problems involving proportions MA 1,4 3.3 V.a, VIII.e	SE: 155-159, 160-164, 170 #49-#51 <i>Reading Mathematics 165</i>
Algebraic Relationships	
1. Understand patterns, relations and functions	
A. Recognize and extend patterns	
B. Create and analyze patterns	
generalize patterns using explicitly or recursively defined functions MA 4 1.6,3.5 VIII.1.b	SE: 233-238, 240-245, 264-270 <i>Algebra Activity 241</i> <i>Graphing Calculator Investigation 265, 278-279</i> <i>Reading Mathematics 239</i> TWE: DI 235
C. Classify objects and representations	
compare and contrast various forms of representations of patterns MA 4 1.6 VIII.a & h	SE: 240-245, 256-262 <i>Algebra Activity 241</i>
D. Identify and compare functions	
understand and compare the properties of linear and exponential functions (include intercepts) MA 4 1.6,3.6 VIII.b & c	SE: 218-223, 226-231, 256-262, 264-270, 272-277, 554-560, 561-565 <i>Graphing Calculator Investigation 224-225, 265, 556</i>
E. Describe the effects of parameter changes	
describe the effects of parameter changes on linear functions MA 4 1.6,4.1 VIII.i	SE: 264-270, 272-277, 292-297 <i>Graphing Calculator Investigation 265, 278-279</i>
2. Represent and analyze mathematical situations and structures using algebraic symbols	
A. Represent mathematical situations	
use symbolic algebra to represent and solve problems that involve linear relationships, including absolute value and recursive relationships MA 4,6 1.6,3.1 VIII.c & d, X.h	SE: 120-126, 128-134, 135-140, 142-148, 149-154, 160-164, 171-177, 233-238, 339-343, 345-351
B. Describe and use mathematical manipulation	
describe and use algebraic manipulations, including factoring and rules of integer exponents MA 4 3.1,4.1 VIII.a & d	SE: 410-415, 417-423, 425-430, 474-479, 481-486, 489-494, 495-500 <i>Algebra Activity 480, 487-488</i>

OBJECTIVES	PAGE REFERENCES
C. Utilize equivalent forms	
use and solve equivalent forms of equations and inequalities (linear) MA 4 1.6,3.4 VIII.d & e	See Lessons 3-2, 3-3, 3-4, 3-5 for equations. See Lessons 6-1, 6-2, 6-3 for inequalities.
D. Utilize systems	
use and solve systems of linear equations with 2 variables MA 4 1.6 VIII.b & d	SE: 369-374, 376-381, 382-386, 387-392, 394-398 <i>Algebra Activity 376</i> <i>Graphing Calculator Investigation 375, 395</i> <i>Spreadsheet Investigation 368</i>
3. Use mathematical models to represent and understand quantitative relationships	
A. Use mathematical models	
identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem MA 4 1.6,3.6 VIII.c	SE: 171-177, 240-245, 264-270, 298-305, 533-538, 554-560, 561-565 <i>Algebra Activity 241, 299</i> <i>Graphing Calculator Investigation 306-307</i> <i>Spreadsheet Investigation 178</i>
4. Analyze change in various contexts	
A. Analyze change	
analyze linear functions by investigating rates of change and intercepts MA 4 1.6,4.1 VIII.a & c	SE: 256-262, 264-270, 272-277 <i>Algebra Activity 271</i> <i>Graphing Calculator Investigation 265, 278-279</i> TWE: DI 260
Geometric and Spatial Relationships	
1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships	
A. Describe and use geometric relationships	
solve problems involving angle relationships (supplementary, complementary angles) and Pythagorean Theorem MA 2 1.6 VI.c	SE: 605-610, 611-615
B. Apply geometric relationships	
apply geometric properties and relationships, such as similarity, to solve multi-step problems in 2 dimensions MA 2 3.6 VI.c	SE: 616-620, 623-630 <i>Algebra Activity 622, 626</i>
C. Compose and decompose shapes	
2. Specify locations and describe spatial relationships using coordinate geometry and other representational systems	
A. Use coordinate systems	
solve problems related to 2-dimensional objects by finding the distance on a Cartesian plane MA 2 3.2 VI.f	SE: 611-615

OBJECTIVES	PAGE REFERENCES
3. Apply transformations and use symmetry to analyze mathematical situations	
A. Use transformations on objects	
represent translations, reflections, rotations, and dilations of objects in the coordinate plane MA 2 1.10 VI.b	SE: 197-203, 211 #57-#59, 415 #71-#73 TWE: DI 199 OEA 530
B. Use transformations on functions	
translate and reflect linear functions MA 4 3.1 VIII,I	SE: <i>Graphing Calculator Investigation</i> 278-279
C. Use symmetry	
4. Use visualization, spatial reasoning and geometric modeling to solve problems	
A. Recognize and draw three-dimensional representations	
draw and use vertex-edge graphs or networks to find optimal solutions MA 6 3.4 X.a	SE: <i>Algebra Activity</i> 759
B. Draw and use visual models	
draw or use visual models to represent and solve problems MA 2 3.1 VI.b & i	SE: 171-177, 205-210, 339-343, 345-351 <i>Algebra Activity</i> 127, 141, 207, 431, 437-438, 450-451
Measurement	
1. Understand measurable attributes of objects and the units, systems and processes of measurement	
A. Determine unit of measurement	
identify and justify appropriate units of measure for velocity MA 1,2 3.1,4.1 V.a, VI.d	SE: 172 Ex 3
B. Identify equivalent measures	
C. Tell and use units of time	
D. Count and compute money	
2. Apply appropriate techniques, tools and formulas to determine measurements	
A. Use standard or non-standard measurement	
B. Use angle measurement	
solve problems of angle measure, including those involving triangles or other polygons MA 2 3.1,3.4 VI.i	SE: 616-620, 623-630 <i>Algebra Activity</i> 622
C. Apply geometric measurements	
determine the surface area and volume of geometric figures, including cones, spheres, and cylinders MA 2 1.10,3.4 VI. i	SE: 124 #24 & #26, 125 #41-#44, 414 #46-#47, 415 #60, 513 #41 <i>Algebra Activity</i> 122, 416

OBJECTIVES	PAGE REFERENCES
D. Analyze precision	
analyze effects of computation on precision MA 2 1.7,3.8 VI.k	SE: <i>Algebra Activity 347</i>
E. Use relationships within a measurement system	
use unit analysis to solve problems involving rates MA 4 3.1 VIII.b	SE: 167-168 Ex 4, 656 Ex 3, 658 #28-#33, 661 Ex 5, 662 #25-#26
Data and Probability	
1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them	
A. Formulate questions	
formulate questions, design studies and collect data about a characteristic MA 3 1.2 VII.a	SE: <i>Algebra Activity 102, 347, 416, 573, 622, 743-744, 759, 783</i>
B. Classify and organize data	
C. Represent and interpret data	
select, create and use appropriate graphical representation of data MA 6 1.8, 3.6 X.b	SE: 88-94, 298-305, 722-728, 737-742 <i>Algebra Activity 734-744</i> <i>Graphing Calculator Investigation 729-730</i>
2. Select and use appropriate statistical methods to analyze data	
A. Describe and analyze data	
apply statistical concepts to solve problems MA 3 1.10,3.4 VII.g	SE: 722-728, 731-736, 737-742 <i>Algebra Activity 734-744</i> <i>Graphing Calculator Investigation 729-730</i>
B. Compare data representations	
given one-variable quantitative data, display the distribution and describe its shape MA 3 1.8 VII.d & I	SE: <i>Graphing Calculator Investigation 729-730</i>
C. Represent data algebraically	
given a scatter plot, determine an equation for a line of best fit MA 3 1.6 VII.b	SE: 298-305 <i>Algebra Activity 299</i> <i>Graphing Calculator Investigation 306-307</i>
3. Develop and evaluate inferences and predictions that are based on data	
A. Develop and evaluate inferences	
make conjectures about possible relationships between 2 characteristics of a sample on the basis of scatter plots of the data and approximate lines of fit	SE: <i>Graphing Calculator Investigation 306-307, 729-730</i>
B. Analyze basic statistical techniques	

OBJECTIVES	PAGE REFERENCES
4. Understand and apply basic concepts of probability	
A. Apply basic concepts of probability	
construct sample spaces and distributions MA 3 3.1 VII.f	SE: 96-101, 754-758, 777-780
B. Use and describe compound events	
GRADE 10	
Number and Operations	
1. Understand numbers, ways of representing numbers, relationships among numbers and number systems	
A. Read, write and compare numbers	
B. Represent and use rational numbers	
use real numbers to solve problems MA 1 3.4 V.1.a	SE: 103-109, 128-134, 135-140, 142-148, 149-154, 155-159, 160-164, 171-177, 598-603, 605-610
C. Compose and decompose numbers	
use a variety of representations to demonstrate an understanding of very large and very small numbers MA 5 3.6 IX.a & d	SE: 425-430
D. Classify and describe numeric relationships	
2. Understand meanings of operations and how they relate to one another	
A. Represent operations	
B. Describe effects of operations	
C. Apply properties of operations	
apply properties of exponents to simplify expressions or solve equations MA 4 1.6,1.10 VIII.c & d	SE: 11-15, 410-415, 417-423, 425-430, 444-448 <i>Algebra Activity 416</i> <i>Graphing Calculator Investigation 418</i> TWE: DI 412
D. Apply operations on real and complex numbers	
apply operations to real numbers, using mental computation or paper-and-pencil calculations for simple cases and technology for more complicated cases MA 1,4,5 1.4,3.4 V.a, VIII.d, IX.6	SE: 11-15, 73-78, 79-83, 84-87, 103-109, 135-140, 142-147, 425-430, 623-630 <i>Graphing Calculator Investigation 148 #59-#64</i>
3. Compute fluently and make reasonable estimates	
A. Describe or represent mental strategies	
B. Develop and demonstrate fluency	
C. Compute problems	
D. Estimate and justify solutions	
judge the reasonableness of numerical computations and their results MA 1 3.8 V.a	SE: 75 Ex 3, 121 Ex 2, 157 Ex 4, 371 Ex 3 <i>Algebra Activity 347</i>

OBJECTIVES	PAGE REFERENCES
E. Use proportional reasoning	
solve problems involving proportions MA 1,4 3.3 V.a, VIII.e	SE: 155-159, 160-164, 170 #49-#51 <i>Reading Mathematics</i> 165
Algebraic Relationships	
1. Understand patterns, relations and functions	
A. Recognize and extend patterns	
B. Create and analyze patterns	
generalize patterns using explicitly or recursively defined functions MA 4 1.6,3.5 VIII.1.b	SE: 233-238, 240-245, 264-270 <i>Algebra Activity</i> 241 <i>Graphing Calculator Investigation</i> 265, 278-279 <i>Reading Mathematics</i> 239 TWE: DI 235
C. Classify objects and representations	
compare and contrast various forms of representations of patterns MA 4 1.6 VIII.a & h	SE: 240-245, 256-262 <i>Algebra Activity</i> 241
D. Identify and compare functions	
understand and compare the properties of linear, exponential and quadratic functions (include domain and range) MA 4 1.6,3.6 VIII.b & c	SE: 256-262, 264-270, 272-277, 524-530, 554-560, 561-565 <i>Graphing Calculator Investigation</i> 224-225, 265, 531-532, 556
E. Describe the effects of parameter changes	
describe the effects of parameter changes on quadratic and exponential functions MA 4 1.6,4.1 VIII.i	SE: 524-530, 533-538, 554-560 <i>Graphing Calculator Investigation</i> 531-532, 545, 556
2. Represent and analyze mathematical situations and structures using algebraic symbols	
A. Represent mathematical situations	
use symbolic algebra to represent and solve problems that involve quadratic relationships, including recursive relationships MA 4,6 1.6,3.1 VIII.c & d, X.h	SE: 120-126, 128-134, 135-140, 142-148, 149-154, 160-164, 171-177, 233-238, 339-343, 345-351
B. Describe and use mathematical manipulation	
describe and use algebraic manipulations, including factoring and rules of integer exponents MA 4 3.1,4.1 VIII.a & d	SE: 410-415, 417-423, 425-430, 474-479, 481-486, 489-494, 495-500 <i>Algebra Activity</i> 480, 487-488
C. Utilize equivalent forms	
use and solve equivalent forms of equations and inequalities (piece-wise and quadratic) MA 4 1.6,3.4 VIII.d	Lesson 10-3 covers quadratic equations. See Glencoe's <i>Algebra 2</i> © 2005 Lessons 2-6 and 9-5 (piece-wise graphed).

OBJECTIVES	PAGE REFERENCES
D. Utilize systems	
use and solve systems of linear equations or inequalities with 2 variables MA 4 1.6 VIII.b & d	SE: 369-374, 376-381, 382-386, 387-392, 394-398 <i>Algebra Activity 376</i> <i>Graphing Calculator Investigation 375, 395</i> <i>Spreadsheet Investigation 368</i>
3. Use mathematical models to represent and understand quantitative relationships	
A. Use mathematical models	
identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem MA 4 1.6,3.6 VIII.c	SE: 171-177, 240-245, 264-270, 298-305, 533-538, 554-560, 561-565 <i>Algebra Activity 241, 299</i> <i>Graphing Calculator Investigation 306-307</i> <i>Spreadsheet Investigation 178</i>
4. Analyze change in various contexts	
A. Analyze change	
analyze quadratic functions by investigating rates of change, intercepts and zeros MA 4 1.6,4.1 VIII.a & c	SE: 524-530, 533-538 <i>Graphing Calculator Investigation 531-532</i>
Geometric and Spatial Relationships	
1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships	
A. Describe and use geometric relationships	
use inductive and deductive reasoning to establish the validity of geometric conjectures, proved theorems and critique arguments made by others MA 2 3.5 VI.d	See Glencoe's <i>Geometry</i> © 2005.
B. Apply geometric relationships	
apply relationships among surface areas and among volumes of similar objects MA 2 3.6 VI.c & i	SE: <i>Algebra Activity 416</i>
C. Compose and decompose shapes	
2. Specify locations and describe spatial relationships using coordinate geometry and other representational systems	
A. Use coordinate systems	
make conjectures and solve problems involving 2-dimensional objects represented with Cartesian coordinates MA 2 3.6,4.1 VI.f	SE: 197-203, 292-297, 611-615
3. Apply transformations and use symmetry to analyze mathematical situations	
A. Use transformations on objects	
use and apply constructions to represent translations, reflections, rotations, and dilations of objects MA 2 1.10 VI.b	See Glencoe's <i>Geometry</i> © 2005.

OBJECTIVES	PAGE REFERENCES
B. Use transformations on functions	
translate, dilate and reflect quadratic and exponential functions MA 4 3.1 VIII.i	SE: 524-530, 554-560 <i>Algebra Activity</i> 525 <i>Graphing Calculator Investigation</i> 531-532, 545, 556
C. Use symmetry	
identify types of symmetries of 2- and 3-dimensional figures MA 2 1.6,1.10 VI.f	See Glencoe's <i>Geometry</i> © 2005.
4. Use visualization, spatial reasoning and geometric modeling to solve problems	
A. Recognize and draw three-dimensional representations	
draw representations of 3-dimensional geometric objects using a variety of tools MA 2 1.4 VI.a	See Glencoe's <i>Geometry</i> © 2005.
B. Draw and use visual models	
draw or use visual models to represent and solve problems MA 2 3.1 VI.b & i	SE: 171-177, 205-210, 339-343, 345-351 <i>Algebra Activity</i> 127, 141, 207, 431, 437-438, 450-451
Measurement	
1. Understand measurable attributes of objects and the units, systems and processes of measurement	
A. Determine unit of measurement	
B. Identify equivalent measures	
C. Tell and use units of time	
D. Count and compute money	
2. Apply appropriate techniques, tools and formulas to determine measurements	
A. Use standard or non-standard measurement	
B. Use angle measurement	
solve problems of angle measure of parallel lines cut by a transversal MA 2 3.1,3.4 VI.f & i	See Glencoe's <i>Geometry</i> © 2005.
C. Apply geometric measurements	
determine the surface area and volume of geometric figures, including cones, spheres, and cylinders MA 2 1.10,3.4 VI.i	SE: 124 #24 & #26, 125 #41-#44, 414 #46-#47, 415 #60, 513 #41 <i>Algebra Activity</i> 122, 416
D. Analyze precision	
analyze effects of computation on precision MA 2 1.7, 3.8 VI.k	SE: <i>Algebra Activity</i> 347
E. Use relationships within a measurement system	

OBJECTIVES	PAGE REFERENCES
Data and Probability	
1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them	
A. Formulate questions	
formulate questions, design studies and collect data about a characteristic MA 3 1.2 VII.a	SE: <i>Algebra Activity</i> 102, 347, 416, 573, 622, 743-744, 759, 783
B. Classify and organize data	
C. Represent and interpret data	
select, create and use appropriate graphical representation of data MA 6 1.8,3.6 X.b	SE: 88-94, 298-305, 722-728, 737-742 <i>Algebra Activity</i> 734-744 <i>Graphing Calculator Investigation</i> 729-730
2. Select and use appropriate statistical methods to analyze data	
A. Describe and analyze data	
apply statistical concepts to solve problems and distinguish between a statistic and a parameter MA 3 1.10,3.4 VII.g	See Glencoe's <i>Geometry</i> © 2005.
B. Compare data representations	
given one-variable quantitative data, display the distribution and describe its shape MA 3 1.8 VII.d & i	SE: <i>Graphing Calculator Investigation</i> 729-730
C. Represent data algebraically	
display and analyze bivariate data where one variable is categorical and the other is numerical MA 3 1.6 VII.e	SE: 722-728
3. Develop and evaluate inferences and predictions that are based on data	
A. Develop and evaluate inferences	
describe how sample statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference MA 3 3.5 VII.a	See Glencoe's <i>Algebra 2</i> © 2005 Lesson 12-9.
B. Analyze basic statistical techniques	
4. Understand and apply basic concepts of probability	
A. Apply basic concepts of probability	
describe the concepts of sample space and probability distribution MA 3 4.1 VII.e	SE: 96-101, 754-758, 777-780
B. Use and describe compound events	
use and describe the concepts of conditional probability and independent events MA 6 1.10,4.1 X.d	SE: 769-776, 777-780, 782-787 <i>Algebra Activity</i> 783

Codes Used for TWE Pages

DI	Differentiated Instruction
OEA	Open-Ended Assessment