



MISSOURI
Mathematics Grade-Level Expectations Grade 10
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OBJECTIVES	PAGE REFERENCES
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: 104-107, 108-111, 116-119, 161 #29-#40, 275 #25-#28, 283-284, 348-350 ATE: 5MW 116 CE 112 EL 106, 284
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: 87 Example 3, 88 #9-#15, 89 #32-#48, 92 <i>Mental Math Tip 87</i> <i>Review and Practice Your Skills 90 #43-#54</i> <i>Technology Note 88</i> ATE: AA 88 LW 88 TT 86, 91
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: 82-85, 86-89, 399 #41-#50 <i>Are You Ready?</i> 374 #1-#12 ATE: 5MW 380 EL 57, 375, 382 RW 375 TT 82
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: 56-59, 76-79, 92, 105 Example 2, 106 #4-#6, 107 #21-#24, 139 #44-#51 <i>Mental Math Tip 87</i> <i>Technology Note 178</i> ATE: TT 391

OBJECTIVES	PAGE REFERENCES
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: 138 Example 4, 272 #27, 508-509 <i>Problem-Solving Tip</i> 123 ATE: 5MW 508 CE 509 GS 92, 108, 274, 508
E. Use proportional reasoning	
solve problems involving proportions MA 1,4 3.3 V.a, VIII.e	SE: 122-125, 276 #4 <i>Are You Ready?</i> 103 #22-#29 <i>Review and Practice Your Skills</i> 130 #1-#23 ATE: CE 123 I 276 TT 103, 122, 124
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: 69 #44, 92-93, 274-275, 279 #20 <i>Review and Practice Your Skills</i> 280 #1-#11, 281 #29-#30 ATE: CE 275 LW 275
C. Classify objects and representations	
compare and contrast various forms of representations of patterns MA 4 1.6 VIII.a & h	SE: 92-93, 274-275, 542-543 ATE: CE 93, 275 LW 93, 275 S 92 TT 542
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: 264-267, 268-271, 275 #7, 276-279 <i>MathWorks</i> 273 <i>Review and Practice Your Skills</i> 272 ATE: CE 265 LW 266
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: 268 #5, 269, 270 #19, #32, 271 #35-#36, 276-277 Example 1, 278 #15-#18 <i>MathWorks</i> 273 #2 ATE: AA 279 CE 269 I 268

OBJECTIVES	PAGE REFERENCES
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: 268-271 <i>Chapter Review 288 #54-#56</i> <i>MathWorks 273</i> <i>Review and Practice Your Skills 272 #14-#27</i> ATE: 5MW 268 CE 269, 272 LW 270
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: 82-85, 86-89, 404-407, 408-411 ATE: CE 405 DI 408 EL 409 LW 406 TT 82, 86
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	SE: 254-257, 258-261 <i>Review and Practice Your Skills 262</i> ATE: CE 255, 259 EL 255 LW 256 TT 254, 259
D. Utilize systems	
use and solve systems of linear equations or inequalities with 2 variables MA 4 1.6 VIII.b & d	SE: 344-347, 348-351 ATE: 5MW 348 CE 345, 349 EL 350 FG 351 LW 346, 350 TT 349
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: 65 #54-#57, 261 #37, 264 Example 1, 265 Example 2, 269 Example 2, 275 #20, 340 #7-#8, 365 #27 <i>MathWorks 273 #3</i> ATE: CE 265
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: 269 Example 2, 270 #6-#8, #29-#30 <i>MathWorks 273</i> <i>Review and Practice Your Skills 272 #25-#27</i> ATE: CE 269

OBJECTIVES	PAGE REFERENCES
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	SE: 548-551 <i>Chapter Review</i> 554 #50-#51 ATE: CE 359, 549 LW 550
B. Apply geometric relationships	
apply relationships among surface areas and among volumes of similar objects MA 2 3.6 VI.c & I	SE: 426-429, 432-435, 452-455, 456-459, 462-463 ATE: AA 426 CE 453 DI 432 I 426 TT 427, 453
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: 246-247, 256 #15, 260 Example 3, 296-299, 300-303, 316-319 <i>MathWorks</i> 305 ATE: AA 246 CE 245, 297, 307 EL 245 TT 248
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	SE: 296-299, 300-303, 306-309, 316-319 ATE: CE 297, 301, 307, 317 DI 316 LW 318
B. Use transformations on functions	
translate, dilate and reflect quadratic and exponential functions MA 4 3.1 VIII.i	SE: 268 #5, 269 #1-#3, 271 #34-#39, 278 #7-#10 <i>Review and Practice Your Skills</i> 272 #14-#19
C. Use symmetry	
identify types of symmetries of 2- and 3-dimensional figures MA 2 1.6,1.10 VI.f	SE: 310-313 <i>Review and Practice Your Skills</i> 314 #8-#16 ATE: CE 311 EL 310, 311, 312 LW 312

OBJECTIVES	PAGE REFERENCES
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	SE: 426-429 <i>Review and Practice Your Skills</i> 430 #10-#15 ATE: AA 426 CE 247 I 426 LW 428
B. Draw and use visual models	
draw or use visual models to represent and solve problems MA 2 3.1 VI.b & i	SE: 436-439, 442-445, 446-449 ATE: CE 437, 443 EL 436, 443 FG 446 LW 438, 444
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	SE: 202-205, 209 #22-#30, 218 #31 <i>Review and Practice Your Skills</i> 210 ATE: CE 203, 210 DI 203, 204 EL 202 LW 204
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: 426-429, 432-435, 452-455, 456-459, 462-463 ATE: AA 426 CE 453 DI 432 I 426 TT 427, 453
D. Analyze precision	
analyze effects of computation on precision MA 2 1.7, 3.8 VI.k	The effects of computation on precision of measurements can be taught with the following examples of indirect measurement. SE: 478-481 ATE: CE 479 DI 479 EL 480 LW 480
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: 7 Example 1, 8-9, 37 #16, 38-41 ATE: 5MW 6 EL 7, 39 LW 8 TT 6
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: 16-19, 21 Example 2, 22 #5, 38-41, 153 #24-#25 ATE: CE 17, 21, 29, 39 LW 40
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	SE: 10-13, 16-19, 20-23, 26-27, 28-31 <i>Chapter Assessment 45</i> <i>Chapter Review 42-44</i> <i>MathWorks 33</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: 16-19, 20-23, 28-31, 38-41 ATE: 5MW 16, 38 CE 17, 21, 29, 39
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: 31 #15, 37 #14, 341 #38 <i>Standardized Test Practice 47 #25</i> ATE: 5MW 20 CE 7 EL 27, 29 I 34
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	SE: 6-9, 23 #7, #12, 26 Problem ATE: 5MW 20 EL 21, 27
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: 10-13, 16-19, 28-31, 158-161 <i>MathWorks 177 #2</i> ATE: CE 159 EL 169 I 172 TT 158, 178

OBJECTIVES	PAGE REFERENCES
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: 168-171 <i>Chapter Review 184 #25-#27</i> <i>Review and Practice Your Skills 176 #1-#18</i> ATE: CE 169 LW 170 TT 170

Codes Used for ATE Pages

5MW	5-Minute Warm-Up
AA	Alternative Assessment
CE	Chalkboard Examples
DI	Differentiated Instruction
EL	Extend the Lesson
FG	Flexible Grouping
GS	Getting Started
I	Introduction to Lesson
LW	Lesson Wrap-Up
R	Refresher Wrap-Up
S	Strategy
TT	Teaching Tip