GLENCOE CORRELATION
MATHMATTERS 1
OHIO
Mathematics Benchmarks and Indicators
Grade Nine

BENCHMARKS AND INDICATORS	PAGE REFERENCES
Number, Number Sense and Operations Standard	
Number and Number Systems	
1. Identify and justify whether properties (closure, identity, inverse, commutative and associative) hold for a given set and operations; e.g., even integers and multiplication.	SE: 118-121, 141 #84-#86, 204 #7-#12 ATE: LS 118, 212, 218
2. Compare, order and determine equivalent forms for rational and irrational numbers.	SE: 74-77, 149 (Technology), 256 #1-#16, 279 #1-#4, 433 #19-#30 *Data Activity* 108 ATE: EL 257 QA 144 (4) TT 433
Meaning of Operations	
3. Explain the effects of operations such as multiplication or division, and of computing powers and roots on the magnitude of quantities.	SE: 129 #10, 132-135, 142-145 ATE: 5MW 56
Computation and Estimation	
4. Demonstrate fluency in computations using real numbers.	SE: 106-107, 110-111, 181 #32-#37 *Problem-Solving Skills* 238-239, 366-367, 502-503
5. Estimate the solutions for problem situations involving square and cube roots.	SE: 142 ex 2, 145 #66 & #68 ATE: TT 142
Measurement Standard	
Measurement Units	
1. Convert rates within the same measurement system; e.g., miles per hour to feet per second; kilometers per hour to meters per second.	SE: 56-59, 60 #23-#37, 61 #63-#68, 69 #42-#47 ATE: CE 57
Use Measurement Techniques and Tools	
2. Use unit analysis to check computations involving measurement.	SE: 71 #8 *Problem-Solving Skills* 72-73 ATE: EL 73
3. Use the ratio of lengths in similar two-dimensional figures or three-dimensional objects to calculate the ratio of their areas or volumes respectively.	SE: 186 #22 & #23, 187 #37-#40 *MathWorks* 183
4. Use scale drawings and right triangle trigonometry to solve problems that include unknown distances and angle measures.	SE: 85 ex 3 & 4, 86 #13, #14, 334-337 *Data Activity* 51 *MathWorks* 79 ATE: CE 85 ex 3
5. Solve problems involving unit conversion for situations involving distances, areas, volumes and rates within the same measurement system.	SE: 87 #57, 97 (portfolio) ATE: CI 97

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Geometry and Spatial Sense Standard	
Characteristics and Properties	
1. Define the basic trigonometric ratios in right triangles: sine, cosine and tangent.	This objective is covered in *MathMatters 2* pages 488-491.
2. Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle measures in similar figures.	SE: 85-86, 88 #46-#54, 334-337, 343 #18-#19 ATE: CE 85
Visualization and Geometric Models	
3. Analyze two-dimensional figures in a coordinate plane; e.g., use slope and distance formulas to show that a quadrilateral is a parallelogram.	SE: 334-337 This reference shows use of a distance formula to find distance between points (not 2-D figures).
Patterns, Functions and Algebra Standard	
Use Patterns, Relations and Functions	
1. Define function with ordered pairs in which each domain element is assigned exactly one range element.	SE: 314-317 ATE: TT 314
2. Generalize patterns using functions or relationships (linear, quadratic and exponential), and freely translate among tabular, graphical and symbolic representations.	SE: 318-321 ATE: TT 319
3. Describe problem situations (linear, quadratic and exponential) by using tabular, graphical and symbolic representations.	SE: 318-321
4. Demonstrate the relationship among zeros of a function, roots of equations, and solutions of equations graphically and in words.	SE: 325 ex 2 & 3, 338-341
5. Describe and compare characteristics of the following families of functions: linear, quadratic and exponential functions; e.g., general shape, number of roots, domain, range, rate of change, maximum or minimum.	SE: 338-341 This reference is limited to linear and non-linear functions.
Use Algebraic Representations	
6. Write and use equivalent forms of equations and inequalities in problem situations; e.g., changing a linear equation to the slope-intercept form.	SE: 209 ex 1, 214 #10, #12, #13, 242 #32-#36, 243 #41 & #42, 328-331
7. Use formulas to solve problems involving exponential growth and decay.	SE: 232-235 This reference uses numerous formulas and is not limited to exponential growth and decay.
8. Find linear equations that represent lines that pass through a given set of ordered pairs, and find linear equations that represent lines parallel or perpendicular to a given line through a specific point.	SE: 318-321

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9. Solve and interpret the meaning of 2 by 2 systems of linear equations graphically, by substitution and by elimination, with and without technology.	This objective is briefly mentioned in the Algebra Reference Guide on page 556.
10. Solve quadratic equations with real roots by factoring, graphing, using the quadratic formula and with technology.	This objective is briefly mentioned in the Algebra Reference Guide on page 556.
11. Add, subtract, multiply and divide monomials and polynomials (division of polynomials by monomials only).	SE: 418-421 ATE: TT 419
Analyze Change	
12. Simplify rational expressions by eliminating common factors and applying properties of integer exponents.	SE: 106 #34-#39, 112 #16-#24, 113 #73-#78, 114-117, 120, 123
13. Model and solve problems involving direct and inverse variation using proportional reasoning.	This objective is covered in *MathMatters 2* Lessons 6-8 and 6-9.
14. Describe the relationship between slope and the graph of a direct variation and inverse variation.	This objective can be met during teacher/class discussion.
15. Describe how a change in the value of a constant in a linear or quadratic equation affects the related graphs.	SE: 318-321 This reference uses a constant for a linear equation.
Data Analysis and Probability Standard	
Data Collection	
1. Classify data as univariate (single variable) or bivariate (two variables) and as quantitative (measurement) or qualitative (categorical) data.	SE: *Data Activity* 5, 103, 155, 259, 305 These references can fulfill these data points.
2. Create a scatterplot for a set of bivariate data, sketch the line of best fit, and interpret the slope of the line of best fit.	SE: 34-37, 43 #23, #24
Statistical Methods	
3. Analyze and interpret frequency distributions based on spread, symmetry, skewness, clusters and outliers.	SE: 24-27, 32 #1-#8 ATE: EL 25
4. Describe and compare various types of studies (survey, observation, experiment), and identify possible misuses of statistical data.	SE: 9#29, 38-31, 34-37, 42 #7, 44 #7-#9, 45 (C.T.) *Data Activity* 5
5. Describe characteristics and limitations of sampling methods, and analyze the effects of random versus biased sampling; e.g., determine and justify whether the sample is likely to be representative of the population.	SE: 6-9, 14, 73 #34, 135 #74 ATE: EL 7
6. Make inferences about relationships in bivariant data, and recognize the difference between evidence of relationship (correlation) and causation.	SE: 35-37

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Probability	
7. Use counting techniques and the Fundamental Counting principle to determine the total number of possible outcomes for mathematical situations.	SE: 436-439, 446-449, 450-455 *Data Activity* 435 *MathWorks* 445, 463 ATE: TT 453
8. Describe, create and analyze a sample space and use it to calculate probability.	SE: 446-449
9. Identify situations involving independent and dependent events, and explain differences between, and common misconceptions about, probabilities associated with those events.	SE: 456-459 *Data Activity* 435 *MathWorks* 445, 463
10. Use theoretical and experimental probability, including simulations or random numbers, to estimate probabilities and to solve problems dealing with uncertainty; e.g., compound events, independent events, simple dependent events.	SE: 440-445 *Problem-Solving Skills* 460-461 ATE: EL 442 TS 440

Codes Used for ATE Pages

5MW	5-Minute Warm-Up
CE	Chalkboard Examples
CI	Chapter Investigation
EL	Extend the Lesson
LS	Learning Styles
QA	Quick Assessment
TS	Teaching Strategies
TT	Teaching Tip