

Michigan Grade Level Content Expectations: Grade 8
Correlated to *Glencoe Algebra 1* ©2006

Number	Expectation	Student Edition Lesson(s)
NUMBER AND OPERATIONS		
Understand real number concepts		
N.ME.08.01	Understand the meaning of a square root of a number and its connection to the square whose area is the number; understand the meaning of a cube root and its connection to the volume of a cube.	2-7, 9-6, 11-1, 11-4
N.ME.08.02	Understand meanings for zero and negative integer exponents.	8-2
N.ME.08.03	Understand that in decimal form, rational numbers either terminate or eventually repeat, and that calculators truncate or round repeating decimals; locate rational numbers on the number line; know fraction forms of common repeating decimals, e.g., $0.\bar{1} = \frac{1}{9}$; $0.\bar{3} = \frac{1}{3}$.	2-1, PS4
N.ME.08.04	Understand that irrational numbers are those that cannot be expressed as the quotient of two integers, and cannot be represented by terminating or repeating decimals; approximate the position of familiar irrational numbers, e.g., $\sqrt{2}$, $\sqrt{3}$, π on the number line.	2-7, 10-4
N.FL.08.05	Estimate and solve problems with square roots and cube roots using calculators.	2-7, 9-6, 10-3, 11-2, 11-3
N.FL.08.06	Find square roots of perfect squares and approximate the square roots of nonperfect squares by locating between consecutive integers, e.g., $\sqrt{130}$ is between 11 and 12.	2-7, 9-6, 10-3, 11-2, 11-3
Solve problems		
N.MR.08.07	Understand percent increase and percent decrease in both sum and product form, e.g., 3% increase of a quantity x is $x + .03x = 1.03x$.	3-7
N.MR.08.08	Solve problems involving percent increases and decreases.	3-7
N.FL.08.09	Solve problems involving compounded interest or multiple discounts.	10-6
N.MR.08.10	Calculate weighted averages such as course grades, consumer price indices, and sports ratings.	3-9
N.MR.08.11	Solve problems involving ratio units such as miles per hour, dollars per pound, or persons per square mile.	3-6, PS3
ALGEBRA		
Understand the concept of non-linear functions using basic examples		

Number	Expectation	Student Edition Lesson(s)
A.RP.08.01	Identify and represent linear functions, quadratic functions, and other simple functions including inverse functions ($y = k/x$), cubics ($y = ax^3$) roots, ($y = \sqrt{x}$), and exponentials ($y = a^x$, $a > 0$), using tables, graphs, and equations.	1-8, 4-6, 10-1, 10-2, 10-4, 10-5
A.PA.08.02	For basic functions, e.g., simple quadratics, direct and indirect variation, and population growth, describe how changes in one variable affect the others.	5-2, 12-1
A.PA.08.03	Recognize basic functions in problem context, e.g., area of a circle is πr^2 , volume of a sphere is $\frac{4}{3} \pi r^3$, and represent them using tables, graphs, and formulas.	1-1, 1-2, 3-1, 3-4, 8-1, 8-2, 8-6, 8-7, 9-3, 9-4, 11-1, 11-2, PS9, PS10
A.RP.08.04	Use the vertical line test to determine if a graph represents a function in one variable.	4-6
Understand and represent quadratic functions		
A.RP.08.05	Relate quadratic functions in factored form and vertex form to their graphs and vice versa; in particular, note that solutions of a quadratic equation are the x-intercepts of the corresponding quadratic function.	10-1, 10-2, 10-4
A.RP.08.06	Graph factorable quadratic functions, finding where the graph intersects the x axis and the coordinates of the vertex; use words “parabola” and “roots”; include functions in vertex form and those with leading coefficient -1 , e.g., $y = x^2 - 36$, $y = (x - 2)^2 - 9$; $y = -x^2$; $y = -(x - 3)^2$.	10-1, 10-2, 10-4
Recognize, represent, and apply common formulas		
A.FO.08.07	Recognize and apply the common formulas: $(a + b)^2 = a^2 + 2ab + b^2$ $(a - b)^2 = a^2 - 2ab + b^2$ $(a + b)(a - b) = a^2 - b^2$; represent geometrically.	9-5, 9-6
A.FO.08.08	Factor simple quadratic expressions with integer coefficients, e.g., $x^2 + 6x + 9$, $x^2 + 2x - 3$ and $x^2 - 4$; solve simple quadratic equations, e.g., $x^2 = 16$ or $x^2 = 5$ (by taking square roots); $x^2 - x - 6 = 0$, $x^2 - 2x = 15$ (by factoring); verify solutions by evaluation.	9-2, 9-3, 9-4, 9-5, 9-6, 10-3, 10-4, 12-9
A.FO.08.09	Solve applied problems involving simple quadratic equations.	9-3, 9-4, 9-5, 9-6, 10-3, 10-4
Understand solutions and solve equations, simultaneous equations, and linear inequalities		
A.FO.08.10	Understand that to solve the equation $f(x) = g(x)$ means to find all values of x for which the equation is true, e.g., determine whether a given value, or values from a given set, is a solution of an equation (0 is a solution of $3x^2 + 2 = 4x + 2$, but 1 is not a solution).	1-3, 7-1

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A.FO.08.11	Solve simultaneous linear equations in two variables by graphing, by substitution, and by linear combination; estimate solutions using graphs; include examples with no solutions and infinitely many solutions.	7-1, 7-2, 7-3, 7-4
A.FO.08.12	Solve linear inequalities in one and two variables, and graph the solution sets.	7-5
A.FO.08.13	Set up and solve applied problems involving simultaneous linear equations and linear inequalities.	7-1, 7-2, 7-3, 7-4, 7-5
GEOMETRY		
Understand and use the Pythagorean Theorem		
G.GS.08.01	Understand at least one proof of the Pythagorean Theorem; use the Pythagorean Theorem and its converse to solve applied problems including perimeter, area, and volume problems.	11-4
G.LO.08.02	Find the distance between two points on the coordinate plane using the distance formula; recognize that the distance formula is an application of the Pythagorean Theorem.	11-5
Solve problems about geometric figures		
G.SR.08.03	Understand the definition of a circle; know and use the formulas for circumference and area of a circle to solve problems.	1-1, 8-2, 9-6, 11-3, PS10, 3-8, 5-2
G.SR.08.04	Find area and perimeter of complex figures by subdividing them into basic shapes (quadrilaterals, triangles, circles).	3-4, 8-2, 8-6, 8-8, 9-2, 9-4
G.SR.08.05	Solve applied problems involving areas of triangles, quadrilaterals, and circles.	1-1, 3-8, 6-2, 8-1, 8-2, 8-7, 8-6, 8-8, 9-1, 9-3, 9-4, 11-1, 11-2, 11-3, 11-4, PS9, PS10
Understand concepts of volume and surface area, and apply formulas		
G.SR.08.06	Know the volume formulas for generalized cylinders ((area of base) x height), generalized cones and pyramids ($\frac{1}{3}$ (area of base) x height) and spheres ($\frac{4}{3} \pi(\text{radius})^3$) and apply them to solve problems.	3-1, PS11
G.SR.08.07	Understand the concept of surface area, and find the surface area of prisms, cones, spheres, pyramids, and cylinders.	1-1, 3-1, 8-1F
Visualize solids		
G.SR.08.08	Sketch a variety of two-dimensional representations of three-dimensional solids including orthogonal views (top, front, and side), picture views (projective or isometric), and nets, use such two-dimensional representations to help solve problems.	

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Understand and apply concepts of transformation and symmetry		
G.TR.08.09	Understand the definition of a dilation from a point in the plane, and relate it to the definition of similar polygons.	4-2
G.TR.08.10	Understand and use reflective and rotational symmetries of two-dimensional shapes, and relate them to transformations to solve problems.	4-2
DATA AND PROBABILITY		
Draw, explain, and justify conclusions based on data		
D.AN.08.01	Determine which measure of central tendency (mean, median, mode) best represents a data set, e.g., salaries, home prices for answering certain questions; justify the choice made.	2-5, PS12
D.AN.08.02	Recognize practices of collecting and displaying data that may bias the presentation or analysis.	1-9, 13-1, 13-3, 13-5
Understand probability concepts for simple and compound events		
D.PR.08.03	Compute relative frequencies from a table of experimental results for a repeated event, and be able to answer questions about the result, using relationship of probability to relative frequency.	14-5
D.PR.08.04	Apply the Basic Counting Principle to find total number of outcomes possible for independent and dependent events, and calculate the probabilities using organized lists or tree diagrams.	14-1, 14-3
D.PR.08.05	Understand the relationship of probability to relative frequency.	14-5
D.PR.08.06	Understand the difference between independent and dependent events, and recognize common misconceptions involving probability, e.g., Alice rolls a 6 on a die three times in a row; she is just as likely to roll a 6 on the fourth roll as she was on any previous roll.	14-3
D.AN.08.07	Compute relative frequencies from a table of experimental results for a repeated event; understand the relationship of experimental probability to relative frequency; answer questions regarding the results.	14-5

Note: Add relative frequency to the *Glencoe Algebra 1* index.