

Knowre Math: Pre-Algebra Curriculum

Chapter 1 Integers and Rational Numbers

Lesson	Topic	MGSE
1-1 Integers and Absolute Values	A) Integers on a Number Line	MGSE6.NS.5, MGSE6.NS.7.c
	B) Comparing and Ordering Integers	
	C) Absolute Value of Integers	
1-2 Adding and Subtracting Integers	A) Adding One-Digit Integers	MGSE7.NS.1.a, MGSE7.NS.1.b, MGSE7.NS.1.c, MGSE7.NS.1.d
	B) Subtracting One-Digit Integers	
	C) Adding Multiple-Digit Integers	
	D) Subtracting Multiple-Digit Integers	
1-3 Multiplying and Dividing Integers	A) Multiplying Integers	MGSE7.NS.2.a, MGSE7.NS.2.b, MGSE7.NS.2.c, MGSE7.EE.3
	B) Dividing Integers	
1-4 Order of Operations with Integers	A) Powers of Integers	MGSE7.NS.2.a, MGSE7.NS.2.c, MGSE7.NS.3, MGSE7.EE.3, MGSE8.EE.1
	B) Order of Operations with Integers	
1-5 Rational Numbers	A) Equivalent Fractions	MGSE7.NS.2.d, MGSE8.NS.1
	B) Fractions as Decimals	
1-6 Adding and Subtracting Fractions	A) Using Integer Rules to Add and Subtract Fractions with Common Denominators	MGSE7.NS.1.d, MGSE7.NS.3, MGSE7.EE.3
	B) Using Integer Rules to Add and Subtract Fractions with Different Denominators	
1-7 Multiplying and Dividing Fractions	A) Using Integer Rules to Multiply Fractions	MGSE7.NS.2.a, MGSE7.NS.2.b, MGSE7.NS.2.c, MGSE7.NS.3, MGSE7.EE.3
	B) Using Integer Rules to Divide Fractions	
	C) Complex Fractions	
1-8 Order of Operations with Rational Numbers	A) Order of Operations with Fractions and Decimals	MGSE7.NS.3, MGSE7.EE.3, MGSE8.EE.1
	B) Order of Operations with Rational Numbers	

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Chapter 2 Basics of Algebra

Lesson	Topic	MGSE
2-1 Variables and Expressions	A) Parts of Variable Expressions	MGSE7.EE.2
	B) Writing Variable Expressions	
2-2 Operations and Variable Expressions	A) Omitting Multiplication Symbols with Variables	MGSE7.EE.1, MGSE7.EE.2
	B) Coefficients	
2-3 Properties of Numbers	A) Commutative Property	MGSE7.NS.1.d, MGSE7.EE.1, MGSE7.EE.2
	B) Associative Property	
	C) Identity Property	
	D) Inverse Property	
2-4 Distributive Property	A) Using the Distributive Property to Write Equivalent Expressions	MGSE7.EE.1, MGSE7.EE.2
2-5 Simplifying Algebraic Expressions	A) Simplifying Expressions with Like Terms	MGSE7.EE.1, MGSE7.EE.2
	B) Order of Operations with Variable Expressions	

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Chapter 3 Solving Equations and Inequalities

Lesson	Topic	MGSE
3-1 One-Step and Two-Step Equations	A) Solutions of One-Variable Equations	MGSE7.EE.4.a, MGSE7.EE.4.c, MGSE8.EE.7.b
	B) Solving One-Step Equations	
	C) Solving Two-Step Equations	
3-2 Multi-Step Equations	A) Solving Multi-Step Equations	MGSE7.EE.4.a, MGSE8.EE.7.a, MGSE8.EE.7.b
	B) Solving Equations with Variables on Both Sides	
	C) Identifying the Number of Solutions of Solved Equations	
	D) Solving Equations with Zero, One, or Many Solutions	
3-3 Equations with Rational Numbers	A) Solving Equations with Grouping Symbols in the Numerator	MGSE7.EE.4.a, MGSE8.EE.7.b
	B) Solving Equations with Fractions	
	C) Solving Equations with Decimals	
3-4 One-Step Addition and Subtraction Inequalities	A) Writing Inequalities	MGSE7.EE.4.b
	B) Solutions of Inequalities	
	C) Solving One-Step Inequalities by Adding or Subtracting on Both Sides	
3-5 One-Step Multiplication and Division Inequalities	A) Solving One-Step Inequalities by Multiplying or Dividing Both Sides by a Positive Number	MGSE7.EE.4.b
	B) Solving One-Step Inequalities by Multiplying or Dividing Both Sides by a Negative Number	
3-6 Multi-Step Inequalities	A) Solving Multi-Step Inequalities	MGSE7.EE.4.b
	B) Inequalities with Zero, Many, or Infinite Solutions	
	C) Graphing Solutions of Multi-Step Inequalities	

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Chapter 4 Proportions and Percents

Lesson	Topic	MGSE
4-1 Proportions	A) Defining Proportions	MGSE7.RP.2.a, MGSE7.RP.2.c, MGSE7.RP.3
	B) Solving Proportions	
	C) Writing Proportions	
4-2 Rate Conversions	A) Converting Units Within a Measurement System	MGSE7.RP.1
	B) Converting Units Between Measurement Systems	
	C) Converting Rates	
4-3 Scale	A) Determining Scale	MGSE7.RP.3, MGSE7.G.1
	B) Using Scale	
4-4 Fractions, Decimals, and Percents	A) Converting Between Fractions and Percents	MGSE7.EE.3
	B) Converting Between Decimals and Percents	
	C) Using Division to Convert Fractions to Percents	
4-5 Proportions and Equations with Percents	A) Percent Proportions	MGSE7.RP.3
	B) Percent Equations	
4-6 Percent Change	A) Amount of Change	MGSE7.RP.3
	B) Percent Change	
4-7 Discount and Markup	A) Discount	MGSE7.RP.3
	B) Markup	

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Chapter 5 Relations and Linear Functions

Lesson	Topic	MGSE
5-1 Input and Output	A) Representing Relations in Different Forms	MGSE8.F.1
	B) Input and Output	
5-2 Relations and Functions	A) Independent and Dependent Variables	MGSE8.F.1
	B) Domain and Range	
	C) Relations and Functions	
5-3 Describing Functions	A) Using Graphs to Describe Functions	MGSE8.F.5
	B) Using Tables to Describe Functions	
5-4 Graphs of Linear Functions	A) Graphs of Linear Function	MGSE7.RP.2.b, MGSE7.RP.2.c, MGSE8.F.4, MGSE8.F.5
	B) Using Linear Functions to Complete Tables	
	C) Graphing Linear Functions	
	D) Solutions of Linear Functions	
	E) Identifying Intercepts	
5-5 Rules for Linear Equations	A) Writing Rules from Tables	MGSE7.RP.2.b, MGSE8.F.4
	B) Converting Between Linear Equations and Rules	
	C) Writing Linear Equations from Tables	
5-6 Direct Variation Graphs	A) Graphs of Direct Variation	MGSE7.RP.2.b, MGSE7.RP.2.c, MGSE7.RP.2.d, MGSE8.EE.5, MGSE8.EE.6, MGSE8.F.3, MGSE8.F.4
	B) Equations of Direct Variation	
5-7 Direct Variation Tables and Equations	A) Tables of Direct Variation	MGSE7.RP.2.b, MGSE7.RP.2.c, MGSE7.RP.2.d, MGSE8.EE.5, MGSE8.EE.6, MGSE8.F.3, MGSE8.F.4
	B) Direct Variation Equations and Coordinate Pairs	

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Chapter 6 Slope-Intercept Form and Systems

Lesson	Topic	MGSE
6-1 Rate of Change	A) Units and Rate of Change	MGSE8.EE.5, MGSE8.EE.6, MGSE8.F.2, MGSE8.F.4
	B) Rate of Change Equation	
	C) Finding Rate of Change	
6-2 Slope	A) Classifying Slopes	MGSE8.EE.5, MGSE8.EE.6, MGSE8.F.4
	B) Slope as Rise Over Run	
	C) Slope of a Line Between Two Points	
6-3 Slope-Intercept Form	A) Understanding Equations in Slope-Intercept Form	MGSE8.EE.6, MGSE8.F.3, MGSE8.F.4
	B) Identifying Slopes and y-Intercepts from Equations in Slope-Intercept Form	
	C) Using Slopes and y-Intercepts to Write Equations in Slope-Intercept Form	
	D) Converting Equations to Slope-Intercept Form	
6-4 Writing and Graphing Equations in Slope-Intercept Form	A) Defining Scientific Notation	MGSE8.EE.6, MGSE8.F.3, MGSE8.F.4
	B) Writing Scientific Notation in Standard Form	
	C) Writing Numbers in Scientific Notation	
	D) Multiplying Numbers in Scientific Notation	
	E) Dividing Numbers in Scientific Notation	
6-5 Solutions of Systems of Equations	A) Graphs of Systems of Equations	MGSE8.EE.8.a, MGSE8.EE.8.b, MGSE8.EE.8.c
	B) Solutions of Systems of Linear Equations	
	C) Graphs of Systems of Equations and the Number of Solutions	
6-6 Graphing to Solve Systems of Equations	A) Graphing Systems of Linear Equations	MGSE8.EE.8.a, MGSE8.EE.8.b, MGSE8.EE.8.c
	B) Graphing to Solve Systems of Linear Equations	
6-7 Substitution to Solve Systems of Equations	A) Substitution to Solve Systems of Equations that Are Solved for the Same Variable	MGSE8.EE.8.b, MGSE8.EE.8.c
	B) Substitution to Solve Systems of Equations that Are Solved for Different Variables	

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Chapter 7 Exponent Properties and Scientific Notation

Lesson	Topic	MGSE
7-1 Integer Exponents	A) Expressions to the Zero Power	MGSE7.EE.2, MGSE8.EE.1
	B) Expressions with Negative Exponents	
7-2 Product of Powers Property	A) Using the Product of Powers Property to Multiply Expressions with a Single Base	MGSE8.EE.1
	B) Using the Product of Powers Property to Multiply Expressions with Multiple Bases	
7-3 Quotient of Powers Property	A) Using the Quotient of Powers Property to Simplify Expressions with a Single Base	MGSE8.EE.1
	B) Using the Quotient of Powers Property to Simplify Expressions with Multiple Bases	
7-4 GCF and LCM of Variable Expressions	A) GCF of Expressions with Variables	MGSE8.EE.1
	B) Simplifying Fractions that Contain Variables	
	C) LCM of Expressions with Variables	
7-5 Fraction Operations with Variables	A) Adding or Subtracting Rational Expressions with Variables - Same Denominator	MGSE8.EE.1
	B) Equivalent Fractions with Variables	
	C) Adding or Subtracting Rational Expressions with Variables - Different Denominators	
	D) Multiplying or Dividing Expressions that Contain Variables	
7-6 Power of a Power Property	A) Expanding Expressions to Show the Power of a Power Property	MGSE8.EE.1
	B) Simplifying Expressions with the Power of a Power Property	
7-7 Power of a Product and Quotient Properties	A) Expanding Expressions to Show the Power of a Product Property	MGSE8.EE.1
	B) Simplifying Expressions with the Power of a Product Property	
	C) Expanding Expressions to Show the Power of a Quotient Property	
	D) Simplifying Expressions with the Power of a Quotient Property	
7-8 Scientific Notation and Standard Form	A) Defining Scientific Notation	MGSE8.EE.3
	B) Writing Scientific Notation in Standard Form	
	C) Writing Numbers in Scientific Notation	

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Chapter 7 Exponent Properties and Scientific Notation (cont.)

Lesson	Topic	MGSE
7-9 Operations with Scientific Notation	A) Adding and Subtracting Numbers in Scientific Notation	MGSE8.EE.4
	B) Multiplying Numbers in Scientific Notation	
	C) Dividing Numbers in Scientific Notation	

Chapter 8 Number Sets and the Pythagorean Theorem

Lesson	Topic	MGSE
8-1 Square Roots	A) Perfect Square Numbers	MGSE8.NS.2, MGSE8.EE.2
	B) Square Roots of Perfect Squares	
	C) Finding the Integers a Square Root Lies Between	
8-2 Cube Roots and Order of Operations	A) Cubing Rational Numbers	MGSE8.NS.2, MGSE8.EE.2
	B) Perfect Cubes	
	C) Cube Roots of Perfect Cubes	
	D) Square or Cube Roots of Squares and Cubes	
	E) Square Roots and the Order of Operations	
8-3 Rational and Irrational Numbers	A) Rational and Irrational Numbers	MGSE8.NS.1, MGSE8.NS.2, MGSE8.EE.2
	B) Ordering Real Numbers	
	C) Approximating Square Roots	
8-4 Solving Equations with Squared Variables	A) Solving Quadratic Equations with Square Roots	MGSE8.EE.2
8-5 Pythagorean Theorem	A) Right Triangles	MGSE8.G.6, MGSE8.G.7
	B) Writing the Pythagorean Theorem	
	C) Using the Pythagorean Theorem to Find Side Lengths	
	D) Using the Inverse of the Pythagorean Theorem	
8-6 Distance Between Points	A) Vertical and Horizontal Distance on the Coordinate Plane	MGSE8.G.7, MGSE8.G.8
	B) Using the Pythagorean Theorem to Find Distance Between Points	
	C) The Distance Formula	

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Chapter 9 Geometry Basics and Angle Relationships

Lesson	Topic	MGSE
9-1 Points and Lines	A) Points	MGSE4.G.1
	B) Lines	
	C) Rays	
	D) Segments	
9-2 Angles	A) Parts of Angles	MGSE7.G.5
	B) Naming Angles	
	C) Adjacent Angles	
	D) Angle Measures	
9-3 Complementary and Supplementary Angles	A) Complementary Angles	MGSE7.G.5
	B) Supplementary Angles	
9-4 Linear Pairs and Vertical Angles	A) Linear Pairs	MGSE7.G.5
	B) Vertical Angles	
9-5 Parallel Lines and Angle Relationships	A) Parallel Lines and Transversals	MGSE8.G.5
	B) Identifying Corresponding, Alternate Exterior, and Alternate Interior Angles	
	C) Parallel Lines and Measures of Related Angles	

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Chapter 10 Triangles and Polygons

Lesson	Topic	MGSE
10-1 Lengths of Sides in Triangles	A) Relationships Among Side Lengths in a Triangle	MGSE7.G.2
	B) Possible Lengths of the Longest or Shortest Side in a Triangle	
10-2 Angle Measures in Triangles	A) Sum of the Measure of Interior Angles of a Triangle	MGSE7.G.2, MGSE8.G.5
	B) Finding a Missing Angle Measure in a Triangle	
10-3 Classifying Triangles	A) Classifying Triangles by Their Angles	MGSE4.G.2
	B) Classifying Triangles by Their Sides	
10-4 Angle and Side Relationships in a Triangle	A) Using Angle Measures to Order the Side Lengths of Triangles	
	B) Using Side Lengths to Order the Angle Measures of Triangles	
10-5 Interior and Exterior Angles of Triangles	A) Interior and Exterior Angles of Triangles	MGSE8.G.5
	B) Exterior Angles of a Triangle and Their Remote Interior Angles	
10-6 Angles of Polygons	A) Diagonals of Polygons	
	B) Concave and Convex Polygons	
	C) Sum of the Measures of Interior Angles of Convex Polygons	

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Chapter 11 Transformations, Congruence, and Similarity

Lesson	Topic	MGSE
11-1 Introduction to Transformations	A) Transformation Statements	MGSE8.G.1, MGSE8.G.2, MGSE8.G.3
	B) Triangles and Transformations	
11-2 Translations	A) Translations on the Coordinate Plane	MGSE8.G.1, MGSE8.G.2, MGSE8.G.3
	B) Writing Translation Functions	
	C) Translations with Translation Functions	
11-3 Reflections	A) Naming the Vertices of a Reflected Preimage	MGSE8.G.1, MGSE8.G.2, MGSE8.G.3
	B) Lines of Reflection	
	C) Identifying Images	
	D) Reflecting in Horizontal and Vertical Lines	
	E) Reflecting in the x-Axis and y-Axis	
	F) Reflecting in $y=x$ and $y=-x$	
11-4 Rotations	A) Rotation about the Center of a Figure	MGSE8.G.1, MGSE8.G.2, MGSE8.G.3
	B) Rotation about the Origin	
11-5 Dilations	A) Types of Dilations	MGSE8.G.3
	B) Scale Factor	
	C) Dilation about a Point	
	D) Dilation about the Origin	
11-6 Congruence	A) Congruent Figures and Congruence Statements	MGSE8.G.2
	B) Corresponding Sides and Angles in Congruent Figures	
	C) Missing Measures in Congruent Figures	
11-7 Similarity	A) Similar Figures and Similarity Statements	MGSE8.G.4, MGSE8.G.5
	B) Corresponding Sides and Angles in Similar Figures	
	C) Missing Measures in Similar Figures	

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Chapter 12 Area, Surface Area, and Volume

Lesson	Topic	MGSE
12-1 Circumference and Area of Circles	A) Parts of Circles	MGSE7.G.4
	B) Relationship Between Radius and Diameter	
	C) Circumference	
	D) Areas of Circles	
12-2 Naming Three-Dimensional Figures	A) Bases of Solids	MGSE7.G.3
	B) Naming Solids	
	C) Cross Sections of Solids	
12-3 Surface Area of Cylinders and Right Prisms	A) Lateral Faces of Prisms	MGSE7.G.6
	B) Surface Areas of Prisms	
	C) Surface Areas of Cylinders	
12-4 Surface Area of Right Pyramids, Cones, and Spheres	A) Lateral Faces of Pyramids	MGSE7.G.6
	B) Slant Height	
	C) Surface Areas of Pyramids	
12-5 Volume of Cylinders and Prisms	A) Volumes of Prisms	MGSE7.G.6,
	B) Volumes of Cylinders	MGSE8.G.9
12-6 Volume of Pyramids and Cones	A) Volumes of Pyramids	MGSE7.G.6,
	B) Volumes of Cones	MGSE8.G.9
12-7 Volume of Spheres	A) Volumes of Spheres	MGSE8.G.9
	B) Volumes of Hemispheres	
	C) Radii of Spheres	

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Chapter 13 Probability and Simulations

Lesson	Topic	MGSE
13-1 Introduction to Probability	A) Numbers that Represent Probability	MGSE7.SP.5
	B) Possible Outcomes	
	C) Events	
	D) Favorable Outcomes	
	E) Likely and Unlikely Events	
13-2 Experimental and Theoretical Probability	A) Experimental Probability of Single and Multiple Events	MGSE7.SP.6, MGSE7.SP.7.a, MGSE7.SP.7.b
	B) Theoretical Probability of Single and Multiple Events	
	C) Theoretical Probability and Making Inferences	
13-3 Compound Events	A) Tables and Outcomes of Independent Events	MGSE7.SP.8.b
	B) Using Multiplication to Count Outcomes for Independent Events	
	C) Tree Diagrams and Outcomes of Dependent Events	
	D) Using Multiplication to Count Outcomes for Dependent Events	
13-4 Compound Probability	A) Probability Notation for Compound Events	MGSE7.SP.8.a, MGSE7.SP.8.b
	B) Probability of Independent Events	
	C) Probability of Dependent Events	
13-5 Populations, Samples, and Bias	A) Population	MGSE7.SP.1, MGSE7.SP.2
	B) Samples	
	C) Data Sets from Random Representative Samples	
13-6 Making Inferences Using Random Samples	A) Samples and Conclusions	MGSE7.SP.1, MGSE7.SP.2
	B) Samples and Predications	
	C) Supporting Predictions and Conclusions	
13-7 Simulations	A) Appropriate Simulations Design	MGSE7.SP.8.c
	B) Making Appropriate Conclusions	
	C) Steps to Designing Simulations	

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Chapter 14 Data Analysis

Lesson	Topic	MGSE
14-1 Measures of Center and Variation	A) Mean and Median	MGSE7.SP.3
	B) Range, MAD, and IQR	
	C) Measures of Variation and Measures of Center	
14-2 Comparative Inferences	A) Dot Plots and Measures of Center and Variability	MGSE7.SP.3, MGSE7.SP.4
	B) Mean as a Multiple of MAD	
	C) Making Statements about Data Sets from Measures of Center and Variability	
14-3 Reading Scatter Plots	A) Scatter Plots	MGSE8.SP.1
	B) Meanings of Points in Scatter Plots	
	C) Patterns in Scatter Plots	
14-4 Lines of Fit	A) Scatter Plots of Linear and Nonlinear Data	MGSE8.SP.2, MGSE8.SP.3
	B) Lines of Fit	
	C) Meanings of Numbers in Lines of Fit	
14-5 Predicting with Lines of Fit	A) Making Predictions with Lines of Fit	MGSE8.SP.2, MGSE8.SP.3
	B) Observed and Predicted Values	