Title	**Pre-Algebra 7 (2014)**
Type	Essential
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Subject	Mathematics
Course	Math Grade 7
Grade(s)	07
Location	Eisenhower Middle School

Title : Pre-Algebra 7 (2014)
Type : Essential

Duration: September/Week 2 - October/Week 5				
UNIT NAME: Number System				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
All quantities can be represented by our number system. Rational numbers have multiple representations. Rules and properties govern operations with rational numbers. Not all numbers are rational.	1. What are rational numbers and irrational numbers? 2. How can a rational number be represented on a number line? 3. How can you add rational numbers using a number line? 4. How can absolute value be used to represent the subtraction of rational numbers?	1a. Rational numbers are defined as the ratio of two integers a over b where b cannot be equal to 0. 1b. A number and its opposite have a sum of 0. 1c. Irrational numbers are non-terminating and non-repeating decimals. 1d. Irrational numbers can be approximated and located on a number line. 2a. Estimate the position of a rational number between two integers on a number line. 2b. Numbers are opposites if they are the same distance from 0 on a number line, but are on opposite sides of 0. 2c. The absolute value of a number is the distance between that number and 0 on a number line. The absolute value of a number a is written |a|. 3a. The sum of two rational numbers with the same sign is the sum of their absolute values with that sign. 3b. The sum of two rational numbers with different signs is the difference of their absolute	1a. Identify and explain if a number is rational. 1b. Express a number in rational form. 1c. Find the opposite of a given number. 1d. Draw a diagram representing a number and its opposite. 1e. Represent a word problem as a numerical expression. 1f. Approximate irrational numbers and locate them on a number line. 2a. Locate and describe the position of a rational number between two integers on a number line. 2b. Represent the absolute value of a number on a number line. 2c. Represent, model, and create authentic situations using absolute value portrayed on vertical and horizontal number lines. 3a. Represent an addition or subtraction word problem on the number line. 3b. Represent an addition or	7.NS-The Number System (07) [State:New Jersey CCSS] 7.NS.1.a-Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged. (07)[State:New Jersey CCSS] 7.NS.1.b-Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. (07)[State:New Jersey CCSS] 7.NS.1.c-Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. (07)[State:New Jersey CCSS] 7.NS.1.d-Apply properties of operations as strategies to add and subtract rational numbers. (07)[State:New Jersey CCSS] 7.NS.2-Apply and extend previous understandings of

	5. What rules and properties exist for operating with rational numbers? 6. What other forms can rational numbers take?	value with the sign of the number of greater absolute value. 4a. Rational numbers can be subtracted by adding the inverse. 4b. The distance between two rational numbers on a number line is the absolute value of their difference. 5a. Rational numbers can be divided provided that the divisor is not 0. 5b. The product of a rational number and 0 is 0. 5c. Represent multiplication as repeated addition with rational numbers. 5d. The Associative and Commutative Properties only relate to addition and multiplication. 5e. An expression can be rewritten using the Distributive Property. 6a. Rational numbers can be represented as decimals, fractions, integers, and percents. 6b. Long division is used to convert a rational number to its equivalent decimal form. 6c. The decimal form of a	subtraction word problem as a numerical expression. 3c. Create a word problem from a numerical expression. 3d. Interpret sums of rational numbers by describing real-world contexts. 4a. Rewrite a subtraction problem using addition. 4b. Use absolute value to represent the distance between two numbers. 5a. Apply the rules and properties for operating with rational numbers to solve real-world problems. 5b. Find the product of two rational numbers with the same and different signs. 5c. Find the quotient of two rational numbers with the same and different signs. 5d. Evaluate a complex fraction 5e. Find the quotient of two decimals. 5f. Rewrite an expression using the Distributive Property. 6a. Convert a rational number to an equivalent form. 6b. Recognize that repeating and terminating decimals are rational numbers.	multiplication and division and of fractions to multiply and divide rational numbers. (07) [State:New Jersey CCSS] 7.NS.2.a-Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. (07) [State:New Jersey CCSS] 7.NS.2.b-Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real world contexts. (07) [State:New Jersey CCSS] 7.NS.2.c-Apply properties of operations as strategies to multiply and divide rational numbers. (07)[State:New Jersey CCSS] 7.NS.2.d-Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. (07)[State:New Jersey CCSS] 7.NS.3-Solve real-world and

		rational number terminates in 0s or repeats Key Terms: rational number, irrational number, absolute value, additive inverse, order of operations, integer, opposite, equivalent fractions, mixed numbers, improper fractions, simplest form, reciprocal, terminating decimal, repeating decimal, complex fraction		mathematical problems involving the four operations with rational numbers.* (07) [State:New Jersey CCSS] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12) [State:New Jersey CCSS] MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.5-Use appropriate tools strategically. (PK, KG, 01-12) [State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS] MP.7-Look for and make use of structure. (KG, 01-12) [State:New Jersey CCSS] MP.8-Look for and express regularity in repeated reasoning. (KG, 01-12)[State:New Jersey CCSS] 8.NS-The Number System (08) [State:New Jersey CCSS] 8.NS.1-Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats

				eventually into a rational number. (08)[State:New Jersey CCSS] 8.NS.2-Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations. (08)[State:New Jersey CCSS]

Title : Pre-Algebra 7 (2014)
Type : Essential

Duration: October/Week 6 - November/Week 11				
UNIT NAME: Ratios and Proportions				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
Understanding of proportional relationships is key to solving a variety of real-life problems.	1. How do you find and compare unit rates? 2. What is a proportional relationship and how can it be expressed?	1a. A ratio compares two quantities. 1b. A rate is ratio of two quantities measured in different units. 1c. A unit rate is a rate that has a denominator of 1 unit when written as a fraction and represents the value per unit. 1d. A complex fraction has a fraction as its denominator and numerator. 2a. Proportional relationships can be represented using tables, graphs, equations, diagrams,	1a. Write a ratio. 1b. Express a rate as a ratio. 1c. Recognize that a unit rate means the value of one. For example, speed and unit price. 1d. Calculate and compare unit rates and determine the optimal choice. 1e. Compute the unit rate measured in like or different units including complex fractions. 2a. Determine if a proportional relationship exists between two ratios. 2b. Write ratios from	7.RP-Ratios and Proportional Relationships (07)[State:New Jersey CCSS] 7.RP.1-Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction ½/¼ miles per hour, equivalently 2 miles per hour. (07)[State:New Jersey CCSS] 7.RP.2-Recognize and represent proportional relationships between quantities. (07)[State:New Jersey CCSS] 7.RP.2.a-Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. (07)[State:New Jersey CCSS] 7.RP.2.b-Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (07)[State:New Jersey CCSS] 7.RP.2.c-Represent proportional relationships by equations. For

	3. What is the constant of proportionality? 4. How can real-world problems involving proportional relationships be modeled? 5. How can a graph be used to represent and interpret real world proportion problems?	and verbal descriptions. 2b. A proportion is an equation that states that two ratios are equal. 3. The constant of proportionality (unit rate) can be determined from tables, graphs, equations, diagrams, and verbal descriptions. 4. Real world problems involving proportional relationships can be represented by equations. 4b. The constant of proportionality is k in	a table or graph and d etermine if all ratios are equivalent. 2c. Test equivalent ratios in a tale or graph on the coordinate plane and observe whether the graph is a straight line through the origin. 3a. Find the constant of proportionality of equivalent ratios from tables, graphs, equations, diagrams, and verbal descriptions. 4a. Write the equation of a proportional relationship. 4b. Create and solve proportions	example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn. (07) [State:New Jersey CCSS] 7.RP.2.d-Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. (07)[State:New Jersey CCSS] 7.RP.3-Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (07) [State:New Jersey CCSS] 7.G.1-Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (07)[State:New Jersey CCSS] 7.G.2-Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no

	6. How can proportional relationships be used to solve multi-step ratio and percent problems? 7. How can proportional	the direct variation equation y = kx. 5a. For any point on a graph of a proportional relationship, the ratio of y to x is the constant of proportionality. 5b. The unit rate can be found in a graph of a proportional relationship using the point (1, r) where r is the unit rate. 6a. A scale drawing has proportional dimensions. 6b. The scale of a scale drawing is the ratio of the	from word problems. 4c. Recognize that the k in a direct variation equation is the constant of proportionality. 5a. Recognize that a graph of a proportional relationship includes the points (0, 0) and (1, r) where r is the unit rate. 5b. Create and graph the equation y = kx from a word problem. 5c. Explain what a point of a proportional relationship means in terms of the situation. 6a. Solve multi-step ratio and percent problems using	triangle. (07)[State:New Jersey CCSS] Common Core State Standards for Mathematics: Standards for Mathematical Practice - Grades KG-12 (2010) (KG, 01-12) [State:New Jersey CCSS] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12) [State:New Jersey CCSS] MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.5-Use appropriate tools strategically. (PK, KG, 01-12) [State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS]

	relationships and scale be applied to create and draw geometric shapes?	dimensions. 6c. Percents are proportional relationships. 6d. Figures are similar if the corresponding angles are congruent and the corresponding sides lengths are proportional. 7. Geometric shapes can be drawn using rulers, protractors, and other tools. <u>Key Terms</u>: Ratio,	proportional relationships. 6b. Create similar figures using scale drawings. 6c. Determine the scale of similar figures. 6d. Determine whether two figures are similar. 6e. Solve percent problems involving simple interest, tax, markups and markdowns, gratuities, commissions, and fees. 6f. Find the length of unknown sides in similar figures. 7. Use tools to draw geometric shapes with given conditions focusing on triangles.	

		rate, unit rate, equivalent ratio, proportion, means and extremes, complex fraction, proportional relationship, constant of proportionality, direct variation, scale drawing, indirect measurement, similar figures, corresponding angles, corresponding sides, simple interest, markups, markdowns, gratuity, commission, and tax		

Title : Pre-Algebra 7 (2014)
Type : Essential

Duration: November/Week 12 - February/Week 22				
UNIT NAME: Expressions and Equations				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
Variables represent quantities in real world or mathematical problems.	1. How can expressions be simplified or expanded? 2. How can expressions be rewritten to solve problems? 3. How can multi-step real-life mathematical problems involving rational numbers be solved?	1a. The properties of operations can be applied to simplify or expand expressions with rational coefficients. 1b. There is a proper order to perform mathematical operations. 2. Different expressions can be equivalent. 3a. Multi-step real-life mathematical problems can be solved using numerical and algebraic equations and inequalities. 3b. Quantities are represented by	1a. Combine, multiply, and/or factor expressions. 1b. Understand and apply the order of operations. 2. Recognizing percents as decimals and vice versa. 3a. Apply properties of operations to solve multi-step real-life mathematical problems using equations and inequalities. 3b. Assess the reasonableness of answers using mental computation and estimation	7.EE-Expressions and Equations (07)[State:New Jersey CCSS] 7.EE.1-Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (07)[State:New Jersey CCSS] 7.EE.2-Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that “increase by 5%” is the same as “multiply by 1.05.” (07) [State:New Jersey CCSS] 7.EE.3-Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If

	4. How can the solution set of an inequality be represented through a graph? 5. How are slope, unit rate, and rate of change related? 6. How can change be measured and illustrated?	variables. 4. The solution to an inequality can be graphed on a number line. 5. Slope is the rate of change (unit rate) of a graph. 6a. Any two points on a line have the same slope as any other two points on the same line. 6b. Vertical lines	strategies. 3c. Represent quantities with variables. 4a. Solve and graph the inequality on a number line. 4b. Interpret the solutions in the context of the problem. 5a. Determine the rate of change (slope) of a graph and vice versa. 5b. Graph proportional relationships. 5c. Compare two different proportional relationships represented in different ways.	you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation. (07)[State:New Jersey CCSS] 7.EE.4-Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (07)[State:New Jersey CCSS] 7.EE.4.a-Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? (07)[State:New Jersey CCSS] 7.EE.4.b-Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This

	7. How are linear equations in one variable solved?	have no slope. 6c. Horizontal lines have a slope of 0. 7. Linear equations in one variable can have one, infinite, or no solutions. <u>Key Terms</u>: Distributive Property, Commutative Property, Associative Property, Multiplicative Inverse, Additive Inverse, Identity Property, Coefficient, Factor, Like Terms,	6a. Derive the equation of a line (y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b). 6b. Show that any two points on a line have the same slope as any other two points on the same line. 7a. Give examples of equations with one, infinite, and no solutions. 7b. Solve linear equations with rational coefficients requiring the use of the distributive property and/or combining like terms.	week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions. (07)[State:New Jersey CCSS] Common Core State Standards for Mathematics: Standards for Mathematical Practice - Grades KG-12 (2010) (KG, 01-12) [State:New Jersey CCSS] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12) [State:New Jersey CCSS] MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.5-Use appropriate tools strategically. (PK, KG, 01-12) [State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS] MP.7-Look for and make use of structure. (KG, 01-12) [State:New Jersey CCSS] MP.8-Look for and express regularity in repeated reasoning. (KG, 01-12)[State:New Jersey CCSS] 8.EE-Expressions and Equations (08)[State:New Jersey CCSS] Understand the connections

		Constant, Expression, Equation, Evaluate, Simplify, Solve, Variables, Inequalities, Quantities, Solution Set, Infinite Solutions, Slope, Rate of Change, Unit Rate, Linear Equation, and Non-linear Equation		between proportional relationships, lines, and linear equations. (08)[State:New Jersey CCSS] 8.EE.5-Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. (08)[State:New Jersey CCSS] 8.EE.6-Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b. (08)[State:New Jersey CCSS] Analyze and solve linear equations and pairs of simultaneous linear equations. (08)[State:New Jersey CCSS] 8.EE.7-Solve linear equations in one variable. (08)[State:New Jersey CCSS] 8.EE.7.a-Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form

				x = a, a = a, or a = b results (where a and b are different numbers). (08)[State:New Jersey CCSS] 8.EE.7.b-Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. (08) [State:New Jersey CCSS]

Title : Pre-Algebra 7 (2014)
Type : Essential

Duration: February/Week 23 - March/Week 28				
UNIT NAME: Statistics and Probability				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
Random sampling can be used to draw inferences about a population. Probability can be used to make predictions.	1. How is a representative sample of the subgroups within the population determined? 2. How can a sample be used to gain information about a population? 3. How are the means and variations of two populations compared?	1. Valid samples can be used to determine characteristics of a population. 2a. Random sampling produces a representative sample. 2b. The sample is used to develop valid inferences about a population with an unknown characteristic of interest. 2c. The sample compares the variation in estimates using multiple samples of the same and different size. 3a. Measures of center and variability	1. Select and d etermine the validity of the sample. 2a. Explain whether a sample is biased or random. 2b. Develop valid inferences about a population from a random sample. 3a. Construct and use dot plots, stem-and-leaf plots, box-and-whisker plots to compare data sets. 3b. Draw informal comparative	7.SP-Statistics and Probability (07)[State:New Jersey CCSS] Use random sampling to draw inferences about a population. (07)[State:New Jersey CCSS] 7.SP.1-Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. (07)[State:New Jersey CCSS] 7.SP.2-Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be. (07)[State:New Jersey CCSS] Draw informal comparative inferences about two

	4. How can the likelihood of an event be described? 5. How is the probability of an event determined? 6. How is the	are used to compare two populations. 3b. Mean absolute deviation is a measure of variability of data points in a population. 4a. The likelihood of an event can be described using the numbers 0 to 1. The closer the probability is to 0, the less likely it is to happen. The closer it is to 1, the more likely it is to happen. 4b. The sum of the probability of an event and its complement is equal to 1. 5a. Experimental probability estimates the probability of an event.	inferences from data and graphs. 4a. Find the probability of an event. 4b. Find the complement of the event. 4c. Use probability notation. 5a. Explain the difference between theoretical and experimental probability. 5b. Determine the theoretical probability. 5c. Conduct experiments to determine the probability of an event.	populations. (07)[State:New Jersey CCSS] 7.SP.3-Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable. (07)[State:New Jersey CCSS] 7.SP.4-Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. (07)[State:New Jersey CCSS] Investigate chance processes and develop, use, and evaluate probability models. (07) [State:New Jersey CCSS] 7.SP.5-Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the

	probability of compound events determined?	5b. Experimental probability is found by comparing the number of times the event occurs to the total number of trials. 5c. Theoretical probability is the probability that an event occurs when all of the outcomes of the experiment are equally likely. 6. Organized lists, tables, tree diagrams, and simulations are used to find the probabilities of compound events. <u>Key Terms:</u> Representative	5d. List the probabilities of all possible outcomes for an event. 5e. Explain the discrepancies in theoretical and experimental probability. 6a. Design a simulation and determine the sample space. 6b. Calculate the fractional probabilities for each outcome. 6c. Determine the frequency of outcomes.	event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. (07) [State:New Jersey CCSS] 7.SP.6-Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times. (07)[State:New Jersey CCSS] 7.SP.7-Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. (07)[State:New Jersey CCSS] 7.SP.7.a-Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be

		Sample, Valid Sample, Subgroup, Population, Random Sample, Biased Sample, Inference, Variation, Prediction, Dot Plot, Box-and-Whisker Plot, Variability, Center and Variability, Measures of Central Tendency, Mean Absolute Deviation, Experiment, Theoretical, Trial, Experimental, Outcome, Event, Compliment, Sample Space, Tree Diagrams, Simulations, and Compound Events		selected. (07)[State:New Jersey CCSS] 7.SP.7.b-Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies? (07) [State:New Jersey CCSS] 7.SP.8-Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. (07) [State:New Jersey CCSS] 7.SP.8.a-Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (07) [State:New Jersey CCSS] 7.SP.8.b-Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event. (07)[State:New Jersey CCSS] 7.SP.8.c-Design and use a simulation to generate frequencies for compound

				events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood? (07) [State:New Jersey CCSS] Common Core State Standards for Mathematics: Standards for Mathematical Practice - Grades KG-12 (2010) (KG, 01-12) [State:New Jersey CCSS] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12) [State:New Jersey CCSS] MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.5-Use appropriate tools strategically. (PK, KG, 01-12) [State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS] MP.7-Look for and make use of structure. (KG, 01-12) [State:New Jersey CCSS] MP.8-Look for and express regularity in repeated reasoning. (KG, 01-12)[State:New Jersey CCSS]

Title : Pre-Algebra 7 (2014)
Type : Essential

Duration: April/Week 29 - May/Week 35				
UNIT NAME: Geometry				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
Shapes can be measured in different ways depending on the purpose using its dimensions. Pairs of angles are related to each other.	1. How are perimeter, circumference, area, surface area, and volume of two and three-dimensional shapes determined and applied to real life situations? 2a. What is the	1a. Formulas can be applied to determine the perimeter, circumference, area, surface area, and volume of two and three-dimensional shapes. 1b. There is a relationship between the radius and the area and circumference of a circle.	1a. Find the perimeter and area of two-dimensional figures and use them to solve problems. 1b. Determine the surface area and volume of prisms, cubes, and pyramids and use them to solve problems. 1c. Name and describe three-dimensional figures. 1d. Find the area and circumference of circles and use them to solve problems. 1e. Use the area formula to find the circumference and use the circumference formula to find the area.	7.G.3-Describe the two-dimensional figures that result from slicing three dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. (07) [State:New Jersey CCSS] 7.G.4-Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. (07)[State:New Jersey CCSS] 7.G.5-Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. (07)[State:New Jersey CCSS] 7.G.6-Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (07)[State:New Jersey CCSS] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12) [State:New Jersey CCSS]

	relationship between the exterior and interior angles of a polygon? 2b. What is the relationship between angles formed by intersecting lines? 3. How can multi-step equations be used to find the unknown measure of an angle in a figure? 4. What 2-dimensional figures result when 3-dimensional figures are sliced from multiple angles?	2a. Formulas are used to find the sum of interior and exterior angles in polygons. 2b. Angles formed by two intersecting lines are either congruent or supplementary. 2c. Angles formed by parallel and transversal lines are either congruent or supplementary. 3. Equations can be written to represent angle relationships. 4a. A slice of a 3-dimensional figure results in a 2-dimensional shape. 4b. 2-dimensional figures resulting from slicing 3-dimensional	1f. Determine the volume of cones, cylinders, and spheres. 2a. Write and solve simple algebraic equations involving supplementary, complementary, vertical, and adjacent angles for multi-step problems. 2b. Find the unknown measure of an angle in a figure. 2c. Draw and describe 2 and 3-dimensional figures. 3. Solve for the variable in an equation to determine the unknown angle.	MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.5-Use appropriate tools strategically. (PK, KG, 01-12) [State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS] MP.7-Look for and make use of structure. (KG, 01-12) [State:New Jersey CCSS] MP.8-Look for and express regularity in repeated reasoning. (KG, 01-12)[State:New Jersey CCSS] 8.G-Geometry (08)[State:New Jersey CCSS] 8.G.1-Verify experimentally the properties of rotations, reflections, and translations: (08) [State:New Jersey CCSS] 8.G.1.b-Angles are taken to angles of the same measure. (08)[State:New Jersey CCSS] 8.G.1.c-Parallel lines are taken to parallel lines. (08)[State:New Jersey CCSS] 8.G.2-Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. (08)[State:New

	5. How are the area and perimeter of 2-dimensional composite figures determined? 6. How are the surface area and volume of 3-dimensional composite solids determined? 7. How are figures	figures can be represented through drawings and written descriptions. 5a. The area of a composite figure is the sum of the areas of the individual shapes. 5b. The perimeter of a composite figure is equal to the sum of the non-overlapping sides of the individual shapes. 6a. The surface area of a 3-dimensional solid is equal to the sum of the non-overlapping faces of the individual solids. 6b. The volume of a composite solid is	4a. Name, describe, and draw 2-dimensional shapes formed when slicing 3-dimensional figures. 4b. Represent 2-dimensional figures resulting from slicing 3-dimensional figures through drawings and written descriptions. 5a. Identify and calculate the sum of the areas of the individual shapes in a composite figure. 5b. Find the missing sides of a shape to determine the perimeter. 6a. Identify and calculate the area of all of the individual	Jersey CCSS] 8.G.3-Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. (08)[State:New Jersey CCSS] 8.G.4-Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two dimensional figures, describe a sequence that exhibits the similarity between them. (08) [State:New Jersey CCSS] 8.G.5-Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so. (08) [State:New Jersey CCSS] 8.G.9-Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. (08) [State:New Jersey CCSS]

	rotated, reflected, and translated? 8. What is the difference between a dilation and other transformations? 9. How can coordinate planes be used to illustrate transformations?	equal to the sum of the volumes of the individual solids. 7. The image and the pre-image of rotations, reflections, and translations are congruent. 8a. Dilation is the reduction or enlargement of a figure. 8b. The image and the pre-image are similar in a dilation. 8c. Shapes and angle measurements	shapes that combine to create the composite solid. 6b. Identify and calculate the volume of all of the individual shapes that combine to create the composite solid. 7a. Utilize the properties of rotation, reflection, and translation to model and relate pre-images of lines, line segments, and angles to their resultant image through physical representations. 7b. Apply multiple sequences of rotations, reflections, and translations. 8. Determine the	

		are maintained. 9a. Transformations can be illustrated on a coordinate plane. <u>Key Terms</u> - Perimeter, area, surface area, volume, prisms, cylinders, cubes, polygons, edges, faces, vertices, base, height, circle, radius, circumference, diameter, pi, pyramid, cross section, irregular figure, composite figure, acute angle, obtuse angle, right angle, straight angle,	scale factor of a dilation. 9a. Plot given coordinate points of the vertices of the pre-image. 9b. Name the coordinates of the resulting image after the transformation. 9c. Write similarity statements.	

		complementary angles, supplementary angles, adjacent angles, vertical angles, congruent angles, intersecting lines, transversal line, perpendicular lines, parallel lines, skew lines, protractor, reflect, translate, dilate, translate, transformation, image, pre-image, coordinate plane, congruent, similar, coordinates, and sequence		

Title : Pre-Algebra 7 (2014)
Type : Essential

Duration: May/Week 36 - June/Week 38				
UNIT NAME: Radicals and Exponents				
Enduring Understandings	**Essential Questions**	**Knowledge**	**Skills**	**Standards**
Exponents can represent very large and very small numbers. Operations can be performed using exponents.	1. How expressions using exponents be simplified? 2. How do you solve equations using square roots and cube roots? 3. What are other ways to write and solve problems with very large and very	1a. Negative exponents can be written as positive integer exponents. 1b. Exponents are simplified using the Product Rule, Quotient Rule, and Power to Power Rule. 2a. Equations involving squares and cubes can be solved using square roots and cube roots. 2b. Square roots of numbers that are not perfect squares are irrational numbers.	1a. Rewrite an expression using only positive integer exponents. 1b. Evaluate numerical expressions containing negative integer exponents or exponents in the denominator. 1c. Apply the properties of integer exponents to simplify and write equivalent numerical expressions. 2a. Evaluate square roots and cubic roots of small perfect squares and cubes respectively. 2b. Solve equations by taking the square	8.EE-Expressions and Equations (08)[State:New Jersey CCSS] 8.EE.1-Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$. (08)[State:New Jersey CCSS] 8.EE.2-Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. (08)[State:New Jersey CCSS] 8.EE.3-Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger. (08)[State:New Jersey CCSS] 8.EE.4-Perform operations with numbers expressed in scientific notation, including problems where both decimal and

	small numbers?	3. Scientific notation can be used to express very large and very small numbers and solve problems involving large and small numbers. 3b. All rational numbers can be expressed in scientific notation. Key Terms: Exponents, Product Rule, Quotient Rule, Power to Power Rule, Perfect Squares, Square Roots, Cube Roots, Perfect Cubes,	or cube root. 3a. Use scientific notation to estimate, express, and compare the values of very large or very small numbers. 3b. Convert standard notation to scientific notation and vice versa. 3c. Apply scientific notation to solve real life problems. 3d. Interpret scientific notation generated by technology.	scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. (08) [State:New Jersey CCSS] Common Core State Standards for Mathematics: Standards for Mathematical Practice - Grades KG-12 (2010) (KG, 01-12) [State:New Jersey CCSS] MP.1-Make sense of problems and persevere in solving them. (PK, KG, 01-12)[State:New Jersey CCSS] MP.2-Reason abstractly and quantitatively. (PK, KG, 01-12) [State:New Jersey CCSS] MP.3-Construct viable arguments and critique the reasoning of others. (PK, KG, 01-12)[State:New Jersey CCSS] MP.4-Model with mathematics. (PK, KG, 01-12)[State:New Jersey CCSS] MP.5-Use appropriate tools strategically. (PK, KG, 01-12) [State:New Jersey CCSS] MP.6-Attend to precision. (PK, KG, 01-12)[State:New Jersey CCSS] MP.7-Look for and make use of structure. (KG, 01-12) [State:New Jersey CCSS] MP.8-Look for and express regularity in repeated reasoning. (KG, 01-12)[State:New Jersey CCSS]

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