



Grade 7

Mathematical Practices
 Students will be able to demonstrate the following practices at the cognitive level of this grade:

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Ratios and Relationships

Content	District Code	Essential Skill	Instructional Mastery			
			1	2	3	4
Proportional Relationships Unit Rates. ILS10 7.RP.1	7.RP.1	Compute unit rates associated with ratios of fractions in like or different units.				M
	7.RP.2	Define proportion as a statement of equality between two ratios.				M
Proportional Relationships Representation. ILS10 7.RP.2	7.RP.3	Define constant of proportionality as a unit rate.				M
	7.RP.4	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.				M
	7.RP.5					M
	7.RP.6	Analyze two ratios to determine if they are proportional to one another with a variety of strategies (e.g. using tables, graphs, pictures, etc.).				M
	7.RP.7	Analyze tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships to identify the concept of proportionality.				M
	7.RP.8	Represent proportional relationships by writing equations.	I			M
	7.RP.9	Explain what the points on a graph of a proportional relationship means in terms of a specific situation.				M
Proportional Relationships Applications. ILS10 7.RP.1	7.RP.10	Recognize situations in which percentage proportional based relationships apply (e.g. 30% off of \$100 vs. 30% off of \$10).	I			M
	7.RP.11	Apply proportional reasoning to solve multi-step ratio and percent problems (e.g. simple interest, tax, markups, markdowns, gratuities, commissions, fees, percent increase and decrease, percent error, etc.).	I			M
Computation with Rational Numbers Addition and Subtraction. ILS10 7.NS.1	7.NS.1	Represent and explain how a number and its opposite have a sum of 0 and are additive inverses using real-world situations.	I	M		
	7.NS.2	Demonstrate and explain how adding two numbers, $p + q$, if q is positive, the sum of p and q will be $ q $ spaces to the right of p on the number line.	I	M		
	7.NS.3	Demonstrate and explain how adding two numbers, $p + q$, if q is negative, the sum of p and q will be $ q $ spaces to the left of p on the number line.	I	M		
	7.NS.4	Identify subtraction of rational numbers as adding the additive inverse property to subtract rational numbers, $p - q = p + (-q)$.	I	M		
	7.NS.5	Apply and extend previous understanding to represent addition and subtraction problems of rational numbers with a horizontal or vertical number line.	I	M		
	7.NS.6	Interpret sums of rational numbers by describing real-world contexts.	I	M		
	7.NS.7	Explain and justify why the sum of $p + q$ is located a distance of $ q $ in the positive or negative direction from p on a number line.	I	M		
	7.NS.8	Represent the distance between two rational numbers on a number line is the absolute value of their difference and apply this principle in real-world contexts.	I	M		
	7.NS.9	Apply the principle of subtracting rational numbers in real-world contexts.	I	M		
	7.NS.10	Apply properties of operations as strategies to add and subtract rational numbers.	I	M		
	7.NS.11	Identify properties of addition and subtraction when adding and subtracting rational numbers.	I	M		

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Content	District Code	Essential Skill	Instructional Mastery			
			1	2	3	4
Computation with Rational Numbers Multiplication. <i>ILS10 7.NS.2</i>	7.NS.12	Solve real-world mathematical problems by adding and subtracting rational numbers, including complex fractions.	I	M		
	7.NS.13	Recognize that the process for fractions can be used to multiply rational numbers including integers.	I	M		
	7.NS.14	Describe the rules when multiplying signed numbers.	I	M		
	7.NS.15	Apply the properties of operations, particularly distributive property, to multiply rational numbers.	I	M		
	7.NS.16	Interpret the products of rational numbers by describing real-world contexts.	I	M		
	7.NS.17	Identify how properties of operations can be used to multiply and divide rational numbers (such as distributive property, multiplicative inverse property, multiplicative identity, commutative property for multiplication, associative property for multiplication, etc.).	I	M		
Computation with Rational Numbers Division. <i>ILS10 7.NS.2</i> <i>ILS10 7.NS.3</i>	7.NS.18	Apply properties of operations as strategies to multiply rational numbers.	I	M		
	7.NS.19	Explain why integers can be divided except when the divisor is 0.	I	M		
	7.NS.20	Describe why the quotient is always a rational number.	I	M		
	7.NS.21	Describe the rules when dividing integers.	I	M		
	7.NS.22	Recognize that $-(p/q) = -p/q = p/-q$.	I	M		
	7.NS.23	Interpret the quotient of rational numbers by describing real-world contexts.	I	M		
Computation with Rational Numbers Decimals. <i>ILS10 7.NS.2</i>	7.NS.24	Identify how properties of operations can be used to multiply and divide rational numbers (such as distributive property, multiplicative inverse property, multiplicative identity, commutative property for multiplication, associative property for multiplication, etc.).	I	M		
	7.NS.25	Apply properties of operations as strategies to divide rational numbers.	I	M		
	7.NS.26	Solve real-world mathematical problems by dividing rational numbers, including complex fractions.	I	M		
	7.NS.27	Convert a rational number to a decimal using long division.	I	M		
Expressions Simplifying and Expanding. <i>ILS10 7.EE.1</i>	7.NS.28	Explain that the decimal form of a rational number terminates (stops) in zeroes or repeats.	I	M		
	7.EE.1	Combine like terms with rational coefficients.			M	
Expressions Equivalent. <i>ILS10 7.EE.2</i>	7.EE.2	Factor and expand linear expressions with rational coefficients using the distributive property.			M	
	7.EE.3	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.			M	
	7.EE.4	Write equivalent expressions with fractions, decimals, percents, and integers.	I		M	
Real-life Applications Expressions. <i>ILS10 7.EE.3</i>	7.EE.5	Rewrite an expression in an equivalent form in order to provide insight about how quantities are related in a problem context.			M	
	7.EE.6	Convert between numerical forms appropriately.			M	
	7.EE.7	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.			M	
	7.EE.8	Apply properties of operations to calculate with numbers in any form.			M	
	7.EE.9	Assess the reasonableness of answers using mental computation and estimation strategies. - Does my answer make sense?	I			M
Real-life Applications Equations. <i>ILS10 7.EE.4</i>	7.EE.10	Fluently solve equations of the form $px + q = r$ and $p(x + q) = r$ with speed and accuracy.			M	
	7.EE.11	Identify the sequence of operations used to solve an algebraic equation of the form $px + q = r$ and $p(x + q) = r$.			M	
	7.EE.12	Graph the solution set of the inequality of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers.			M	
	7.EE.13	Use variables and construct equations to represent quantities of the form $px + q = r$ and $p(x + q) = r$ from real-world and mathematical problems.			M	
	7.EE.14	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.			M	
	7.EE.15	Compare an algebraic solution to an arithmetic solution by identifying the sequence of the operations used in each approach. This can be answered algebraically by using only the formula for perimeter ($P=2l+2w$) to isolate w or by finding an arithmetic solution by substituting values into the formula.			M	

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	7.EE.16	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.			M	
	7.EE.17	Interpret the solution set of an inequality in the context of the problem.			M	
	7.EE.18	Solve problems by reasoning about the quantities involved.			M	
Geometric Figures Scale Drawing. <i>ILS10 7.G.1</i>	7.G.1	Use ratios and proportions to create scale drawing.				M
	7.G.2	Identify corresponding sides of scaled geometric figures.				M
	7.G.3	Compute lengths and areas from scale drawings using strategies such as proportions.				M
	7.G.4	Solve problems involving scale drawings of geometric figures using scale factors.				M
	7.G.5	Reproduce a scale drawing that is proportional to a given geometric figure using a different scale.				M
Geometric Figures Triangles. <i>ILS10 7.G.2</i>	7.G.6	Identify conditions which create unique triangles, more than one triangle, or no triangle. (equilateral right).				M
	7.G.7	Analyze given conditions based on the three measures of angles or sides of a triangle to determine when there is a unique triangle, more than one triangle, or no triangle.				M
	7.G.8	Construct triangles from three given angle measures to determine when there is a unique triangle, more than one triangle or no triangle using appropriate tools (freehand, rulers, protractors, and technology).				M
	7.G.9	Construct triangles from three given side measures to determine when there is a unique triangle, more than one triangle or no triangle using appropriate tools (freehand, rulers, protractors, and technology).				M
Geometric Figures Cross-Sections of Three-Dimensional Figures. <i>ILS10 7.G.3</i>	7.G.10	Define slicing as the cross-section of a three-dimensional figure.				M
	7.G.11	Describe the two-dimensional figures that result from slicing a three-dimensional figure such as a right rectangular prism or pyramid.				M
	7.G.12	Analyze three-dimensional shapes by examining two dimensional cross-sections.				M
Geometric Figures Circles. <i>ILS10 7.G.4</i>	7.G.13	Identify the parts of a circle including radius, diameter, area, circumference, center, and chord.	I			M
	7.G.14	Identify π and justify about how it is derived.			I	M
	7.G.15	Identify formulas for area and circumference of a circle.	I			M
	7.G.16	Find the area of a circle given the circumference.	I			M
	7.G.17	Find the circumference of a circle given the area.		I		M
	7.G.18	Apply circumference or area formulas to solve mathematical and real-world problems.		I		M
	7.G.19	Justify the formulas for area and circumference of a circle and how they relate to π .				M
	7.G.20	Informally derive the relationship between circumference and area of a circle.				M
Geometric Figures Angles. <i>ILS10 7.G.5</i>	7.G.21	Identify and recognize types of angles: supplementary, complementary, vertical, adjacent.			I	M
	7.G.22	Determine complements and supplements of a given angle.			I	M
	7.G.23	Determine unknown angle measures by writing and solving algebraic equations based on relationships between angles.			I	M
Geometric Figures Applications. <i>ILS10 7.G.6</i>	7.G.24	Use the formulas for area and volume and the procedure for finding surface area in real-world and math problems for two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.				M
	7.G.25	Solve real-world and math problems involving area, surface area and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.				M
Sampling Techniques. <i>ILS10 7.SP.1</i>	7.SP.1	Recognize statistics terms such as population, sample, sample size, random sampling, generalizations, valid, biased and unbiased.				M
	7.SP.2	Recognize sampling techniques such as convenience, random, systematic, and voluntary.				M
	7.SP.3	Explain that generalizations about a population from a sample are valid only if the sample is representative of that population.				M
	7.SP.4	Apply statistics to gain information about a population from a sample of the population.				M

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	7.SP.5	Generalize that random sampling tends to produce representative samples and support valid inferences.				M
Random Samples. <i>ILS10 7.SP.1</i> <i>ILS10 7.SP.2</i>	7.SP.6	Define random sample.				M
	7.SP.7	Identify an appropriate sample size.				M
	7.SP.8	Analyze & interpret data from a random sample to draw inferences about a population with an unknown characteristic of interest.			I	M
	7.SP.9	Generate multiple samples (or simulated samples) of the same size to determine the variation in estimates or predictions by comparing and contrasting the samples.				M
	7.SP.10	Identify measures of central tendency (mean, median, and mode) in a data distribution.			I	M
Measures of Central Tendency and Variability. <i>ILS10 7.SP.3</i>	7.SP.11	Identify measures of variation including upper quartile, lower quartile, upper extreme-maximum, lower extreme-minimum, range, interquartile range, and mean absolute deviation (i.e. box-and-whisker plots, line plot, dot plots, etc.).			I	M
	7.SP.12	Compare two numerical data distributions on a graph by visually comparing data displays, and assessing the degree of visual overlap.			I	M
	7.SP.13	Compare the differences in the measure of central tendency in two numerical data distributions by measuring the difference between the centers and expressing it as a multiple of a measure of variability.			I	M
	7.SP.14	Find measures of central tendency (mean, median, and mode) and measures of variability (range, quartile, etc.).			I	M
Data Analysis. <i>ILS10 7.SP.4</i>	7.SP.15	Analyze and interpret data using measures of central tendency and variability.			I	M
	7.SP.16	Draw informal comparative inferences about two populations from random samples.				M
	7.SP.17	Express probability as a number between zero and one.				M
Probability. <i>ILS10 7.SP.5</i>	7.SP.18	Explain that a random event with a probability of $\frac{1}{2}$ is equally likely to happen.				M
	7.SP.19	Infer that as probability moves closer to 1 it is increasingly likely to happen.				M
	7.SP.20	Infer that as probability moves closer to 0 it is decreasingly likely to happen.				M
	7.SP.21	Draw conclusions to determine that a greater likelihood occurs as the number of favorable outcomes approaches the total number of outcomes.			I	
	7.SP.22	Determine relative frequency (experimental probability) is the number of times an outcome occurs divided by the total number of times the experiment is completed			I	
	7.SP.23	Determine the relationship between experimental and theoretical probabilities by using the law of large numbers.			I	
	7.SP.24	Predict the relative frequency (experimental probability) of an event based on the (theoretical) probability.			I	
	7.SP.25	Recognize uniform (equally likely) probability.			I	
Experimental v. Theoretical Probability. <i>ILS10 7.SP.6</i>	7.SP.26	Use models to determine the probability of events.			I	
	7.SP.27	Develop a uniform probability model and use it to determine the probability of each outcome/event.			I	
	7.SP.28	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.			I	
Uniform Probability. <i>ILS10 7.SP.7</i>	7.SP.29	Analyze a probability model and justify why it is uniform or explain the discrepancy if it is not.			I	
	7.SP.30	Define and describe a compound event.			I	M
	7.SP.31	Describe the probability of a compound event as the fraction of outcomes in the sample space for which the compound event occurs.			I	M
	7.SP.32	Identify the outcomes in the sample space for an everyday event.			I	M
	7.SP.33	Define simulation.				M
Compound Probability. <i>ILS10 7.SP.8</i>	7.SP.34	Find probabilities of compound events using organized lists, tables, tree diagrams, etc. and analyze the outcomes.			I	M
	7.SP.35	Choose the appropriate method such as organized lists, tables and tree diagrams to represent sample spaces for compound events.			I	M
	7.SP.36	Design and use a simulation to generate frequencies for compound events.			I	M
	7.SP.37	Recognize uniform (equally likely) probability.				M
	7.SP.38	Use models to determine the probability of events.				M
	7.SP.39	Develop a uniform probability model and use it to determine the probability of each outcome/event.				M

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