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Ratios and Proportional Relationships 7.RP	**Ratios and Proportional Relationships 7.RP**
Analyze proportional relationships and use them to solve real-world and mathematical problems.	**Analyze proportional relationships and use them to solve real-world and mathematical problems.**
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* $^{1/2}/_{1/4}$ *miles per hour, equivalently 2 miles per hour.* **(7.RP.1.)**	Compute unit rates involving fractions. (CS)
2. Recognize and represent proportional relationships between quantities.	Given a situation make comparative statements using ratios, fractions, and percents. (CS) Graph and explain the solution set of inequality. (FW)
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.	I can determine if a rate table describes proportional relationship. (CS)
b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	Identify unit rate and apply to new situations. (CS) Solve multi-step real-world and mathematical problems with integers. (MSA) Write an equation from a table. (MSA) Write an equation from a graph. (MSA) Construct a table and graph from an equation. (MSA) Solve and check my solution to a two-step equation. (MSA) Find the slope of a line from a graph, table, equation, and from two points. (MSA) Tell if a table represents a linear relationship. (MSA) Tell if a graph represents a linear relationship. (MSA) Tell if an equation represents a linear relationship. (MSA)
c. Represent proportional relationships by equations. *For 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.*	Show proportional relationships using equations. (VP) Represent proportional relationship with tables and equations (rate tables). (CS)
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. **(7.RP.2.)**	Explain what any point (x,y) means on the graph in any context. (VP) Explain the meaning of a point on a graph of a proportional relationship. (MSA)

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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.* **(7.RP.3.)**	Determine if comparative statements are accurate using ratios, fractions, and percents. (CS) I can set up and solve real world problems using proportions. (CS)
The Number System 7.NS	**The Number System 7.NS**
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	**Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.**
1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.	Explain addition and subtraction of integers using a number line. (AN)
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.*	Describe situations in which opposite quantities combine to make zero. (AN)
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.	Show the relationship between a positive or negative number and its opposite when adding or subtracting. (AN)
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.	Explain why adding the opposite works for subtracting integers. (AN)
d. Apply properties of operations as strategies to add and subtract rational numbers. **(7.NS.1.)**	Solve computation problems by adding integers. (AN) Solve computation problems by subtracting integers. (AN) Use properties of operations to solve addition and subtraction problems with integers. (AN)
2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Solve computation problems by dividing integers. (AN)

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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.	Solve computation problems by multiplying integers. (AN) Use the distributive property to expand or factor an expression. (AN)
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.	Solve computation problems by dividing integers. (AN)
c. Apply properties of operations as strategies to multiply and divide rational numbers.	Use properties of operations to solve multiplication and division problems with integers. (AN)
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. **(7.NS.1.)**	Convert a rational number into a terminating or repeating decimal. (AN)
3. Solve real-world and mathematical problems involving the four operations with rational numbers.[1] (7.NS.3.)	Solve real-world problems by adding, subtracting, multiplying, or dividing rational numbers. (AN)
Expressions and Equations 7.EE	**Expressions and Equations 7.EE**
Use properties of operations to generate equivalent expressions.	**Use properties of operations to generate equivalent expressions.** Solve and check my solution to a two-step equation. (MSA)
1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. **(7.EE.1.)**	Solve and check my solution to a two-step equation. (MSA)
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."* **(7.EE.2.)**	Rewrite expressions in different forms to show how the quantities are related. (MSA)
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**

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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 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.* **(7.EE.3.)**	Solve multi-step, real-world problems using tables, graphs, and/or equations. (VP) Apply the order of operations to correctly solve a number sentence. (AN) Solve multi-step real-world and mathematical problems with integers. (AN)
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.	Represent a real-word situation as an equation. (VP) Solve multi-step real-world and mathematical problems with integers. (MSA) Construct and solve inequalities. (MSA)
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?*	Solve word problems using the forms $px + q = r$ and $p(x + q) = r$ (VP)
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 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.* **(7.EE.4.)**	Graph and explain the solution set of inequality. (MSA)
Geometry 7.G	**Geometry 7.G**
Draw, construct, and describe geometrical figures and describe the relationships between them.	**Draw, construct, and describe geometrical figures and describe the relationships between them.**

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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. **(7.G.1.)**	Find corresponding sides and angles of similar figures. (SS) Find the scale factor of similar figures. (SS) Apply a scale factor to create similar figures. (SS) Determine if two shapes are similar. (SS) Describe what will happen to a shape when a rule is applied to its coordinates. (SS) Compute actual lengths and areas from a scale drawing. (FW) Reproduce a scale drawing at a different scale. (FW) Draw geometric shapes with given conditions. (FW)
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 triangle. **(7.G.2.)**	Construct triangles given side lengths and/or angle measures. (SS)
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. **(7.G.3.)**	Describe the 2D figures that result from slicing 3D figures include right rectangular prisms and right rectangular pyramids (FW)
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	**Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.**
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. **(7.G.4.)**	Write, use and explain the formula for the circumference of a circle. (FW) Write, use and explain the formula for the area of a circle. (FW)
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. **(7.G.5.)**	I can find angle measures using properties of supplementary, complimentary, vertical, and adjacent properties. (SS) Solve for an unknown angle in a figure. (FW)
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. **(7.G.6.)**	Describe the relationship between perimeter, area and angles of similar figures when give a scale factor. (SS) Find the area of 2D objects using real world problems. (FW) Find the surface area of 3D objects using real world problems. (FW) Find the volume of 3D objects using real world problems. (FW)

Statistics and Probability 7.SP	**Statistics and Probability 7.SP**
Use random sampling to draw inferences about a population.	**Use random sampling to draw inferences about a population.**

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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. **(7.SP.1.)**	Identify good and bad representations of random sampling. (DD)
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.* **(7.SP.2.)**	Use random sampling to make predictions about a whole population. (DD)
Draw informal comparative inferences about two populations.	**Draw informal comparative inferences about two populations.**
3. Informally assess the degree of visual overlap of two numerical data distributions with similar variability's, 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.* **(7.SP.3.)**	Find the mean absolute deviation of a data set. (DD)
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.* **(7.SP.4.)**	I can write comparative statements about two data sets using measures of center and variability. (DD)
Investigate chance processes and develop, use, and evaluate probability models.	**Investigate chance processes and develop, use, and evaluate probability models.**
5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the 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. **(7.SP.5.)**	Estimate the probability (from 0 to 1) of a situation occurring. (WDYE)

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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.* **(7.SP.6.)**	Use theoretical and experimental probabilities to make predictions. (WDYE)
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.	Find probabilities of compound events using probability models (lists, tables, tree diagrams, and/or area models). (WDYE)
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 selected.*	Define and give examples of essential vocabulary. (WDYE) Find theoretical and experimental probabilities. (WDYE)
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?* **(7.SP.7.)**	Define and give examples of essential vocabulary. (WDYE) Find theoretical and experimental probabilities. (WDYE)
8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	Use a simulation (ex: spinners, free-throws, etc.) to determine frequency and probability. (WDYE)
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.	Find probabilities of compound events using probability models(7.SP.7 & 7.SP.8a,b,c) _____ lists _____ tables _____ tree diagrams _____ area models (WDYE)
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.	Find probabilities of compound events using probability models(7.SP.7 & 7.SP.8a,b,c) _____ lists _____ tables _____ tree diagrams _____ area models (WDYE)

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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?* **(7.SP.8.)**	Find probabilities of compound events using probability models(7.SP.7 & 7.SP.8a,b,c) _____ lists _____ tables _____ tree diagrams _____ area models (WDYE)

[1] Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

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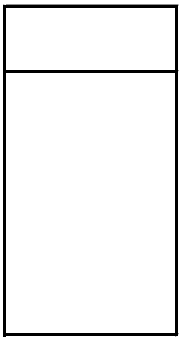

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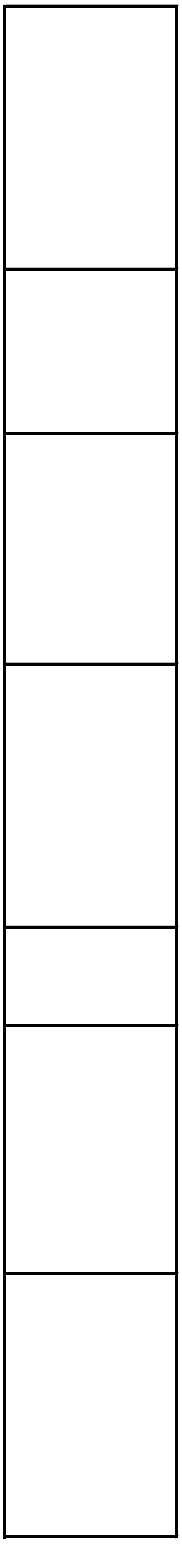

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