

Grade 7 Math

Length of Class: School Year

Program/Text Used: MathScope

Competency 1: Ratios and Proportional Relationships - Students will demonstrate the ability to understand proportional relationships and use them to solve real-world and mathematical problems.

Performance Indicator(s)	Advanced Competent (In addition to B)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
Students will analyze proportional relationships and use them to solve real-world and mathematical problems.	I can compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in <u>like</u> or <u>different</u> units. <i>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.</i>	I can compute unit rates associated with ratios of <u>whole numbers and decimals</u> , including ratios of lengths, areas and other quantities measured in <u>like</u> or <u>different</u> units.	I can compute unit rates associated with ratios of <u>whole numbers and decimals</u> , including ratios of lengths, areas and other quantities measured in <u>like</u> units.	I incorrectly compute unit rates with whole numbers and decimals.
Students will analyze proportional relationships and use them to solve real-world and mathematical problems.	I can <u>explain</u> 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.	I can <u>identify</u> the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. <u>Represent</u> proportional relationships by equations. <i>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 $t = pn$.</i>	I can <u>decide</u> whether two quantities are in a proportional relationship. <i>For example, 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>	I <u>inconsistently</u> decide whether two quantities are in proportional relationship. I demonstrate limited ability to graph or use tables to determine the proportional relationship.

Competency 1: Ratios and Proportional Relationships, cont.

Performance Indicator(s)	Advanced Competent (In addition to B)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
<p>Students will be able to analyze proportional relationships and use them to solve real-world and mathematical problems.</p>	<p>I can use proportional relationships to solve multistep ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i></p> <p><i>Our note ~ include a change in level of complexity of language used across levels of performance. Include increasing level of expectation for student's written work using mathematical language and notation.</i></p>	<p>I can use proportional relationships to solve multistep ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, <u>percent increase and decrease.</u></i></p>	<p>I can use proportional relationships to solve multistep ratio and percent problems. <i>Examples: tax, markups and markdowns, gratuities, commissions, and fees.</i></p>	<p>I use proportional relationships incorrectly to solve multistep ratio and percent problems or I use proportional relationships to solve single step ratio and percent problems.</p>

Competency 2: The Number System - Students will demonstrate the ability to apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
Students will apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	I can interpret sums and differences of rational numbers by <u>describing</u> and <u>applying</u> real-world contexts.	I can represent addition and subtraction of <u>rational</u> numbers on a horizontal or vertical number line diagram. I can apply properties of operations as strategies to add and subtract rational numbers.	I can apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction of <u>integers</u> on a horizontal or vertical number line diagram. I can describe situations in which opposite quantities combine to make 0. <i>For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.</i>	I inconsistently apply previous understandings of addition and subtraction of rational numbers. I inaccurately represent integers on a horizontal or vertical number line. I display a limited ability to describe situations in which opposite quantities combine to make 0.
	I can design real-world scenarios using the concepts of absolute value and rational numbers.	I understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. I can show that the distance between two rational numbers on the number line is the absolute value of their difference. I can interpret sums and differences of rational numbers by describing and applying real-world contexts using the concepts of absolute value.	I 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. I can show that a number and its opposite have a sum of 0 (are additive inverses).	I demonstrate an unclear sense of the relationship of a number and its opposite.

Competency 2: The Number System, cont.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
<p>Students will be able to apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.</p>	<p>I can solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions.</p>	<p>I can interpret products of rational numbers by describing real-world contexts. I can interpret quotients of rational numbers by describing real-world contexts. I can apply properties of operations as strategies to multiply and divide rational numbers.</p>	<p>I can apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers. I 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. I 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. <i>If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. 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.</i></p>	<p>I inconsistently apply previous understandings of multiplication and division of rational numbers. I demonstrate a limited understanding of the multiple representations of signed integer division. I compute division of rational numbers inaccurately to convert a rational number to a decimal.</p>

Competency 3: Expressions and Equations - Students will demonstrate the ability to use properties of operations to generate equivalent expressions and to solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
Students will use properties of operations to generate equivalent expressions.	I understand that rewriting an expression in different forms in a problem context can <u>shed light</u> on the problem and how the quantities in it are related. <i>For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”</i> <i>Our note ~ Shed light includes analysis and synthesis</i>	I can <u>apply</u> properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	I can <u>recognize</u> use of the properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. <i>Our note ~ Recognizing combining like terms, use of distributive property.</i>	I demonstrate a limited recognition of the use of properties of operations as strategies.
Students will be able to solve real-life and mathematical problems using numerical and algebraic expressions and equations.	I can solve <u>multi-step</u> real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. I can 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. <i>For example: If a woman</i>	I can solve <u>single-step</u> 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. <i>For example: If a woman</i>	I can solve <u>single-step</u> real-life and mathematical problems posed with integers, using tools strategically. Assess the reasonableness of answers using mental computation and estimation strategies.	I inaccurately solve single-step problems with integers. Limited ability to use estimation and mental computation strategies to assess the reasonableness of answers.

<p>Students will be able to solve real-life and mathematical problems using numerical and algebraic expressions and equations.</p>	<p><i>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</i></p>	<p><i>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</i></p>	<p>I can use variables to represent quantities in a real-world or mathematical problems, and construct <u>simple</u> equations to solve problems.</p>	<p>I demonstrate incorrect use of variables to represent quantities and/or to construct simple equations.</p>
<p>Students will be able to solve real-life and mathematical problems using numerical and algebraic expressions and equations.</p>	<p>I can 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. <u>Graph</u> the solution set of the inequality and <u>interpret</u> it in the context of the problem. <i>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.</i></p>	<p>I can 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. <u>Solve</u> equations of these forms fluently. <u>Compare</u> an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i></p>	<p>I can use variables to represent quantities in a real-world or mathematical problems, and construct <u>simple</u> equations to solve problems.</p>	<p>I demonstrate incorrect use of variables to represent quantities and/or to construct simple equations.</p>

Competency 4: Geometry - Students will demonstrate the ability to draw, construct and describe geometric figures in order to solve real-world problems involving angle measure, area, surface area, and volume.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
Students will be able to draw, construct, and describe geometrical figures and describe relationships between them.	I can 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.	I can solve problems involving scale drawings of geometric figures, including computing actual lengths <u>and</u> areas from a scale drawing.	I can solve problems involving scale drawings of geometric figures, including computing actual lengths from a scale drawing. <i>Our note ~ recognizes scale factor and unit of measure information from drawings.</i>	I incorrectly compute actual lengths from a scale drawing.
Students will be able to draw, construct, and describe geometrical figures and describe relationships between them.	I can 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 <u>unique triangle, more than one triangle</u> , or no triangle	I can 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 triangle, or no triangle. <i>Our note ~ it says constructing vs. formal constructions.</i>	I can draw (freehand, with ruler and protractor, <u>or</u> with technology) geometric shapes with given conditions. <i>Our note ~ changed "and" to "or" for competent.</i>	I can draw geometric shapes with given conditions with errors.

Competency 4: Geometry, cont.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
Students will be able to solve real-life and mathematical problems involving angle measure, area, surface area and volume.	I can describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. <i>Our note ~ any slice, any prism, any pyramid.</i>	I can describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. <i>Our note ~ vertical and horizontal slices only, rectangular prisms and pyramids are only examples, include all types of right and oblique prisms and pyramids.</i>	I can describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms. <i>Our note ~ vertical and horizontal slices only, rectangular prisms is only an example, include all types of right prisms. Do not include cylinders and cones.</i>	I inaccurately describe the two-dimensional figures that result from slicing three-dimensional figures.
	I know the formulas for the area and circumference of a circle and can use them to solve <u>more complex and composite</u> problems; give an informal derivation of the relationship between the circumference and area of a circle.	I know the formulas for the area and circumference of a circle and can use them to solve <u>more complex and composite</u> problems; give an informal derivation of the circumference and area of a circle.	I <u>know</u> the formulas for the area and circumference of a circle and can use them to solve <u>simple</u> problems.	I inconsistently apply the formulas for area and circumference to solve simple problems.
	I can use facts about supplementary, vertical, and adjacent angles in a <u>multi-step</u> problem to <u>write</u> and <u>solve</u> simple equations for an unknown angle in a figure.	I can use facts about supplementary, vertical, and adjacent angles in a <u>multi-step</u> problem to <u>solve</u> for an unknown angle in a figure.	I can use facts about supplementary, complementary, vertical, and adjacent angles to <u>solve</u> for an unknown angle in a figure.	I inaccurately use facts to solve for an unknown angle in a figure.

Competency 4: Geometry, cont.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
	<p>I can solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects <u>composed</u> of triangles, quadrilaterals, polygons, cubes, and right prisms and <u>explain</u> the process used.</p>	<p>I can solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects <u>composed</u> of triangles, quadrilaterals, polygons, cubes, and right prisms, and pyramids. <i>Our note ~ includes composite figures.</i></p>	<p>I can solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects <u>consisting</u> of triangles, quadrilaterals, polygons, cubes, and right prisms.</p>	<p>I can solve problems involving area, volume and surface area with limited ability.</p>

Competency 5: Statistics and Probability - Students will demonstrate the ability to use random sampling to draw inferences about a population, draw informal comparative inferences about two populations, and investigate chance processes and develop, use and evaluate probability models.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
<p>Students will be able to use random sampling to draw inferences about a population.</p>	<p>I can use data from a random sample to draw inferences about a population with an unknown characteristic of interest. I can generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. <i>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.</i></p>	<p>I can demonstrate <u>understanding</u> 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. I can demonstrate <u>understanding</u> that random sampling tends to produce representative samples and support valid inferences.</p>	<p>I can <u>define and illustrate</u> population, sample and random sampling. I can <u>distinguish</u> random and representative samples and those that are not random or representative to support valid inferences.</p>	<p>I exhibit limited understanding and demonstrations of populations and random samples.</p>

Competency 5: Statistics and Probability, cont.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
<p>Students will be able to draw informal comparative inferences about two populations.</p>	<p>I can <u>use</u> measures of center and measures of variability for numerical data from random samples <u>to draw</u> informal comparative inferences about two populations. <i>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.</i></p>	<p>I can <u>informally</u> 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. <i>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.</i> <i>Our note ~ show population graphs and describe differences in these populations.</i></p>	<p>Given two populations, I can <u>calculate</u> measures of center and measures of variability including absolute mean deviation. I can <u>graph</u> that data on a dot plot.</p>	<p>I inaccurately calculate measures of center and variability.</p>

Competency 5: Statistics and Probability, cont.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
<p>Students will investigate chance processes and develop, use, and evaluate probability models.</p>	<p>I can discuss the factors that contribute to the likelihood of a given real-world event using appropriate vocabulary.</p>	<p>I can develop a logical argument that shows and explains why values close to zero correlate with a low probability or unlikely event and why values close to one correlate with a high probability or likely event.</p>	<p>I can demonstrate understanding that the 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.</p>	<p>I can demonstrate a limited understanding of probability.</p>
<p>Students will investigate chance processes and develop, use, and evaluate probability models.</p>	<p>I can <u>develop</u> a probability model (<u>which may not be uniform</u>) by observing frequencies in data generated from a chance process. <i>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?</i></p>	<p>I can <u>develop</u> a probability model and use it to find probabilities of events. I can compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. I can <u>develop</u> a <u>uniform</u> probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>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.</i></p>	<p>I can <u>approximate</u> 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. <i>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.</i></p>	<p>I can demonstrate partial understanding of the ability to approximate chance events.</p>

Competency 5: Statistics and Probability, cont.

Performance Indicator(s)	Advanced Competent (In addition to)	Beyond Competent (In addition to C)	Competent	Not Yet Competent
	<p>I can <u>design</u> and <u>use</u> a simulation to generate frequencies for compound events.</p> <p><i>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?</i></p>	<p>I can <u>represent</u> 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”), I can identify the outcomes in the sample space which compose the event.</p>	<p>I can <u>find</u> probabilities of compound events using organized lists, tables, tree diagrams, and simulation. I can demonstrate <u>understanding</u> 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</p>	<p>I can demonstrate limited ability to find probabilities of compound events.</p>

Competency 6: Fact Fluency - Students will demonstrate the ability to quickly and accurately verbalize and compute fact fluency.

Performance Indicator(s)	Competent	Not Yet Competent
<p>Students will be able to demonstrate the ability to accurately and efficiently perform basic mathematical skills.</p>	<p>I can demonstrate fluency with addition, subtraction, multiplication, and division facts both mentally and with paper and pencil.</p>	<p>I inconsistently demonstrate fluency with addition, subtraction, multiplication, or division facts both mentally and with paper and pencil.</p>