



## Grade 4 Mathematics

This document provides correlations between the 2023 Indiana Academic Standards (IAS) and the Common Core State Standards (CCSS) for easy reference. This correlation guide is intended to help support conversations regarding state and national standards and may be used as one of many tools to help inform a variety of local decisions (e.g., selection of high-quality curricular materials, curriculum maps).

The 2023 Indiana Academic Standards resulted from the standards streamlining process required by Indiana Code (IC) 20-31-3-1(c-d) and were adopted by the Indiana State Board of Education in June 2023. Standards designated as essential (E) for student mastery by the end of the grade level are shaded in gray and all standards were renumbered to avoid gaps in sequencing.

2023 Indiana Academic Standard		Common Core State Standard		Differences Between 2023 IAS and CCSS
<b>Domain: Number Sense</b>				
Number	Text	Number	Text	Description
<b>4.NS.1</b>	Read and write whole numbers up to 1,000,000. Use words, models, standard form, and expanded form to represent and show equivalent forms of whole numbers up to 1,000,000.	<b>4.NBT.2</b>	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$ , $=$ , and $<$ symbols to record the results of comparisons.	IAS specifies a range up to 1,000,000 and the use of models to represent and show equivalent forms. CCSS requires comparing numbers.
<b>4.NS.2</b>	Model mixed numbers and improper fractions using visual fraction models such as number lines and area models. Use a visual fraction model to show the equivalency between whole numbers and whole numbers as fractions.	<b>3.NF.3c</b>	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.	IAS requires the use of visual fraction models and modeling mixed numbers and improper fractions.

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<p><b>4.NS.3</b></p>	<p>Use fraction models to represent two equivalent fractions with attention to how the number and size of the parts differ even though the fractions themselves are the same size. Use this principle to generate equivalent fractions. [In grade 4, limit denominators of fractions to 2, 3, 4, 5, 6, 8, 10, 25, 100.] (E)</p>	<p><b>4.NF.1</b></p>	<p>Explain why a fraction <math>a/b</math> is equivalent to a fraction <math>(n \times a)/(n \times b)</math> by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.</p>	<p>IAS specifies which denominators of fractions to use.</p>
<p><b>4.NS.4</b></p>	<p>Compare two fractions with different numerators and different denominators (e.g., by creating common denominators or numerators, or by comparing to a benchmark, such as 0, <math>1/2</math>, and 1). Explain why comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols <math>&gt;</math>, <math>=</math>, or <math>&lt;</math>, and justify the conclusions (e.g., by using a visual fraction model). (E)</p>	<p><b>4.NF.2</b></p>	<p>Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as <math>1/2</math>. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols <math>&gt;</math>, <math>=</math>, or <math>&lt;</math>, and justify the conclusions, e.g., by using a visual fraction model.</p>	<p><i>No content differences identified.</i></p>
<p><b>4.NS.5</b></p>	<p>Write tenths and hundredths in decimal and fraction notations. Use words, models, standard form, and expanded form to represent decimal numbers to hundredths. Mentally calculate fraction and decimal equivalents for halves and fourths (e.g., <math>1/2 = 0.5 = 0.50</math>, <math>7/4 = 1 \frac{3}{4} =</math></p>	<p><b>4.NF.6</b></p>	<p>Use decimal notation for fractions with denominators 10 or 100.</p>	<p>IAS requires the use of models to represent decimal numbers and to know fraction and decimal equivalents for halves and fourths. CCSS includes reading and writing decimals to thousandths.</p>
		<p><b>5.NBT.3a</b></p>	<p>Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., <math>347.392 = 3 \times</math></p>	

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	1.75). (E)		$100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$ .	
<b>4.NS.6</b>	Compare two decimals to hundredths by reasoning about their size based on the same whole. Record the results of comparisons with the symbols $>$ , $=$ , or $<$ , and justify the conclusions (e.g., by using a visual model). (E)	<b>4.NF.7</b>	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$ , $=$ , or $<$ , and justify the conclusions, e.g., by using a visual model.	<i>No content differences identified.</i>
<b>4.NS.7</b>	Use place value understanding to round multi-digit whole numbers to any given place value.	<b>4.NBT.3</b>	Use place value understanding to round multi-digit whole numbers to any place.	<i>No content differences identified.</i>
<b>2023 Indiana Academic Standard</b>		<b>Common Core State Standard</b>		<b>Differences Between 2023 IAS and CCSS</b>
<b>Domain: Computation and Algebraic Thinking</b>				
<b>Number</b>	<b>Text</b>	<b>Number</b>	<b>Text</b>	<b>Description</b>
<b>4.CA.1</b>	Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Describe the strategy and explain the reasoning. (E)	<b>4.NBT.5</b>	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	CCSS specifies how to explain the reasoning.

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<p><b>4.CA.2</b></p>	<p>Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Describe the strategy and explain the reasoning. (E)</p>	<p><b>4.NBT.6</b></p>	<p>Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</p>	<p>CCSS specifies how to explain the reasoning.</p>
<p><b>4.CA.3</b></p>	<p>Show how the order in which two numbers are multiplied (commutative property) and how numbers are grouped in multiplication (associative property) will not change the product. Use these properties to show that numbers can be multiplied in any order. Investigate and apply the distributive property. (E)</p>			
<p><b>4.CA.4</b></p>	<p>Investigate the mathematical relationship between factors and multiples for whole numbers from 1-100, including the set of factors and multiples for given numbers. Identify sets of factors and multiples for any given whole number up to 100.</p>	<p><b>4.OA.4</b></p>	<p>Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.</p>	<p>CCSS requires students to determine prime and composite numbers.</p>

<p><b>4.CA.5</b></p>	<p>Solve real-world problems with whole numbers involving multiplicative comparison (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem), distinguishing multiplicative comparison from additive comparison. [In grade 4, division problems should not include a remainder.] (E)</p>	<p><b>4.OA.2</b></p>	<p>Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.</p>	<p>IAS specifies that real-world division problems should not include a remainder.</p>
<p><b>4.CA.6</b></p>	<p>Add and subtract fractions with common denominators using visual fraction models. Decompose non-unit fractions to represent them as iterations of unit fractions. (E)</p>	<p><b>4.NF.3a</b></p>	<p>Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.</p>	<p>CCSS includes justifying decompositions.</p>
		<p><b>4.NF.3b</b></p>	<p>Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.</p>	
<p><b>4.CA.7</b></p>	<p>Add and subtract mixed numbers with common denominators (e.g., by replacing each mixed number with an equivalent fraction and/or by using properties of operations and the relationship between addition and subtraction).</p>	<p><b>4.NF.3c</b></p>	<p>Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.</p>	<p><i>No content differences identified.</i></p>

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<b>4.CA.8</b>	Solve real-world problems involving addition and subtraction of fractions referring to the same whole and having common denominators (e.g., by using visual fraction models and equations to represent the problem). (E)	<b>4.NF.3d</b>	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	IAS places emphasis on solving real-world problems.
<b>4.CA.9</b>	Describe the relationship between two terms and use it to find a second number when a first number is given. Generate a number pattern that follows a given rule.	<b>4.OA.5</b>	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.	<i>No content differences identified.</i>
<b>2023 Indiana Academic Standard</b>		<b>Common Core State Standard</b>		<b>Differences Between 2023 IAS and CCSS</b>
<b>Domain: Geometry</b>				
<b>Number</b>	<b>Text</b>	<b>Number</b>	<b>Text</b>	<b>Description</b>
<b>4.G.1</b>	Identify, describe, and draw parallelograms, rhombuses, and trapezoids using appropriate tools (e.g., ruler, straightedge, and technology).			
<b>4.G.2</b>	Identify, describe, and draw rays, angles (right, acute, obtuse), and perpendicular and parallel lines using appropriate tools (e.g., ruler, straightedge, and technology). Identify these in two-dimensional	<b>4.G.1</b>	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	IAS includes describing these objects and specifies using appropriate tools. IAS includes points, lines, and line segments in 3.G.2.

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	figures.			
<b>4.G.3</b>	Classify triangles and quadrilaterals based on the presence or absence of parallel or perpendicular lines, or right, acute, or obtuse angles.	<b>4.G.2</b>	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	IAS specifies classifying triangles and quadrilaterals.
<b>2023 Indiana Academic Standard</b>		<b>Common Core State Standard</b>		<b>Differences Between 2023 IAS and CCSS</b>
<b>Domain: Measurement</b>				
<b>Number</b>	<b>Text</b>	<b>Number</b>	<b>Text</b>	<b>Description</b>
<b>4.M.1</b>	Measure length to the nearest quarter-inch, eighth-inch, and millimeter. (E)			
<b>4.M.2</b>	Within given measurement systems, convert larger units to smaller units, including km, m, cm; kg, g; lb, oz; l, ml; hr, min, sec., and use these conversions to solve real-world problems. (E)	<b>4.MD.1</b>	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb., oz.; l, ml; hr., min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.	IAS requires conversions be used to solve real-world problems. CCSS specifies using two-column tables.

<p><b>4.M.3</b></p>	<p>Use the four operations to solve real-world problems involving distances, intervals of time, volumes, masses of objects, and money. Include addition and subtraction problems involving simple fractions and problems that require expressing measurements given in a larger unit in terms of a smaller unit. (E)</p>	<p><b>4.MD.2</b></p>	<p>Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.</p>	<p>IAS places emphasis on solving real-world problems and using addition and subtraction involving simple fractions. CCSS requires students to represent measurement quantities using diagrams.</p>
<p><b>4.M.4</b></p>	<p>Apply the area and perimeter formulas for rectangles to solve real-world and other mathematical problems. Investigate the area of complex shapes composed of rectangles by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts; apply this technique to solve real-world problems and other mathematical problems. (E)</p>	<p><b>4.MD.3</b></p>	<p>Apply the area and perimeter formulas for rectangles in real world and mathematical problems.</p>	<p><i>No content differences identified.</i></p>
<p><b>3.MD.7d</b></p>	<p>Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.</p>			



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2023 Indiana Academic Standard		Common Core State Standard		Differences Between 2023 IAS and CCSS
Domain: Data Analysis				
Number	Text	Number	Text	Description
<b>4.DA.1</b>	Formulate questions that can be addressed with data. Collect, organize, and graph data from observations, surveys, and experiments using line plots with whole number intervals, single- and scaled bar graphs, and frequency tables. Solve real-world problems by analyzing and interpreting the data using grade-level computation and comparison strategies. (E)			
<b>4.DA.2</b>	Make a line plot to display a data set of measurements in fractions of a unit ( $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{8}$ ). Solve problems involving addition and subtraction of fractions by using data displayed in line plots.	<b>4.MD.4</b>	Make a line plot to display a data set of measurements in fractions of a unit ( $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{8}$ ). Solve problems involving addition and subtraction of fractions by using information presented in line plots.	<i>No content differences identified.</i>

### Mathematics Process Standards

2023 Indiana Academic Standard	Common Core State Standard	Differences Between 2023 IAS and CCSS
<p><b>PS.1: Make sense of problems and persevere in solving them.</b>                      Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway, rather than simply jumping into a solution attempt. They consider analogous problems and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" and "Is my answer reasonable?" They understand the approaches of others to solving complex problems and identify correspondences between different approaches. Mathematically proficient students understand how mathematical ideas interconnect and build on one another to produce a coherent whole.</p>	<p><b>MP.1: Make sense of problems and persevere in solving them.</b>                      Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient</p>	<p>IAS summarizes what mathematically proficient students can do, while CCSS gives examples of what mathematically proficient students might do at different grade levels.</p>

	<p>students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.</p>	
<p><b>PS.2: Reason abstractly and quantitatively.</b> Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.</p>	<p><b>MP.2: Reason abstractly and quantitatively.</b> Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.</p>	<p><i>No content differences identified.</i></p>

<p><b>PS.3: Construct viable arguments and critique the reasoning of others.</b>  Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They analyze situations by breaking them into cases and recognize and use counterexamples. They organize their mathematical thinking, justify their conclusions and communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. They justify whether a given statement is true always, sometimes, or never. Mathematically proficient students participate and collaborate in a mathematics community. They listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.</p>	<p><b>MP.3: Construct viable arguments and critique the reasoning of others.</b>  Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.</p>	<p>IAS explains that mathematically proficient students can justify statements that are true always, sometimes, or never. IAS also states that mathematically proficient students participate and collaborate in a mathematics community. CCSS gives examples of what mathematically proficient students might do at different grade levels.</p>
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<p><b>PS.4: Model with mathematics.</b>          Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace using a variety of appropriate strategies. They create and use a variety of representations to solve problems and to organize and communicate mathematical ideas. Mathematically proficient students apply what they know and are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.</p>	<p><b>MP.4: Model with mathematics.</b>          Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.</p>	<p>IAS summarizes what mathematically proficient students can do, while CCSS gives examples of what mathematically proficient students might do at different grade levels.</p>
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<p><b>PS.5: Use appropriate tools strategically.</b> Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Mathematically proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. Mathematically proficient students identify relevant external mathematical resources, such as digital content, and use them to pose or solve problems. They use technological tools to explore and deepen their understanding of concepts and to support the development of learning mathematics. They use technology to contribute to concept development, simulation, representation, reasoning, communication and problem solving.</p>	<p><b>MP.5: Use appropriate tools strategically.</b> Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.</p>	<p>IAS summarizes what mathematically proficient students can do, while CCSS gives examples of what mathematically proficient students might do at different grade levels.</p>
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<p><b>PS.6: Attend to precision.</b> Mathematically proficient students communicate precisely to others. They use clear definitions, including precision. correct mathematical language, in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They express solutions clearly and logically by using the appropriate mathematical terms and notation. They specify units of measure and label axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently and check the validity of their results in the context of the problem. They express numerical answers with a degree of precision appropriate for the problem context.</p>	<p><b>MP.6: Attend to precision.</b> Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.</p>	<p>IAS summarizes what mathematically proficient students can do, while CCSS gives examples of what mathematically proficient students might do at different grade levels.</p>
<p><b>PS.7: Look for and make use of structure.</b> Mathematically proficient students look closely to discern a pattern or structure. They step back for an overview and shift perspective. They recognize and use properties of operations and equality. They organize and classify geometric shapes based on their attributes. They see expressions, equations, and geometric figures as single objects or as being composed of several objects.</p>	<p><b>MPS.7: Look for and make use of structure.</b> Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see <math>7 \times 8</math> equals the well remembered <math>7 \times 5 + 7 \times 3</math>, in preparation for learning about the distributive property. In the expression <math>x^2 + 9x + 14</math>, older students can see the 14 as <math>2 \times 7</math> and the 9 as <math>2 + 7</math>. They recognize the significance of an existing line in a</p>	<p>IAS summarizes what mathematically proficient students can do, while CCSS gives examples of what mathematically proficient students might do at different grade levels.</p>

	<p>geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see <math>5 - 3(x - y)^2</math> as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers <math>x</math> and <math>y</math>.</p>	
<p><b>PS.8: Look for and express regularity in repeated reasoning.</b> Mathematically proficient students notice if calculations are repeated and look for general methods and shortcuts. They notice regularity in mathematical problems and their work to create a rule or formula. Mathematically proficient students maintain oversight of the process, while attending to the details as they solve a problem. They continually evaluate the reasonableness of their intermediate results.</p>	<p><b>MP.8: Look for and express regularity in repeated reasoning.</b> Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation <math>(y - 2)/(x - 1) = 3</math>. Noticing the regularity in the way terms cancel when expanding <math>(x - 1)(x + 1)</math>, <math>(x - 1)(x^2 + x + 1)</math>, and <math>(x - 1)(x^3 + x^2 + x + 1)</math> might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the</p>	<p>IAS summarizes what mathematically proficient students can do, while CCSS gives examples of what mathematically proficient students might do at different grade levels.</p>



	details. They continually evaluate the reasonableness of their intermediate results.	
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