Tools and Topics

Inspiring Connections Course 1, Prelude

Spotlight On: Venues for Learning

Throughout the school year, students will work in teams in various settings: at tables, at vertical non-permanent surfaces (VNPSs), and with electronic devices. Each day, they will use their Mathematician's Notebook and an electronic device to access the curriculum. The Mathematician's Notebook is where they can write down ideas, draw pictures, make graphs, work through problems, write solutions, and take notes to remember later. Students will use their electronic devices to access problems, look at images, access links, and more.

The Big Picture

CPM's methodology is based on the following principles.

- All students are capable of understanding mathematics deeply.
- Learning mathematics takes time, effort, and support.
- Students learn mathematics more deeply when they discuss the material with classmates and work in teams.
- Students make greater meaning and see more connections when they experience mathematics in different contexts and with a variety of problems.
- Students need to engage and re-engage with topics over time.

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

0.1.3: Operations With Decimal Numbers
0.1.4: Even and Odd Numbers
0.1.5: Fractions
0.1.6: Multiplication Using Area Models

Welcome to *Inspiring Connections Course 1*!

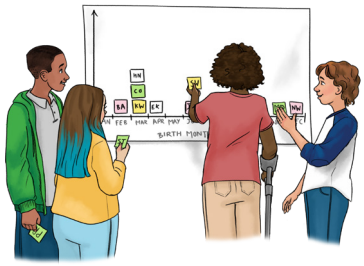
Inspiring Connections Course 1 is a research-based course for mathematics with a student-centered, problem-based approach.

Current Topics

In the Prelude, students will learn the skills necessary for success in this course. These skills include working collaboratively, communicating mathematical ideas, giving and receiving productive feedback, practicing an academic mindset, and thinking like a mathematician.

Collaboration

An important function of the Prelude is to build a foundation for collaborative working relationships. Students will work together to learn how their classmates show respect, communicate and participate in discussions, and view classroom working agreements.



Standards for Mathematical Practice

Students will be encouraged to use their full linguistic repertoire as they build their mathematical identities and work on the Standards for Mathematical Practice:

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

Positive Academic Mindsets

Supports in the Prelude include reflection questions, opportunities to promote various perspectives, and reminders to focus on the iterative learning process. In addition to building a classroom environment where students will thrive, these practices help students develop positive academic mindsets.

Try This at Home!

Throughout this course, students will write both learning reflections and goal reflections in their journals. Ask your student to show you these journals and talk about the benefits of writing down one's thoughts.

Tools and Topics

Inspiring Connections Course 1, Chapter 1

Spotlight On: Teams

The CPM curriculum is guided by the philosophy that students need to be active participants in developing their own mathematical understanding. The team structure creates a setting in which students are continuously in the presence of others with whom they can share ideas and articulate their thinking. In teams, students can take risks, where it may be easier than in a large class setting. Students communicate with teammates who may see things differently, giving them opportunities to gain new perspectives, discover new connections between ideas, and practice justifying their reasoning.

The Big Picture

Growing From

Fraction operations;
Representing and interpreting line plots;
Writing numerical expressions

Working On

Number operations;
Analyzing data;
Writing expressions

Growing To

Comparing positive and negative numbers;
Absolute value;
Measures of center and spread;
Evaluating expressions

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

1.2.1: Data Displays
1.2.2: Perimeter and Area
1.2.3: Rectangles and Square Units
1.3.1: Base and Height of a Rectangle
1.3.4: Adding and Subtracting Multi-Digit Decimals

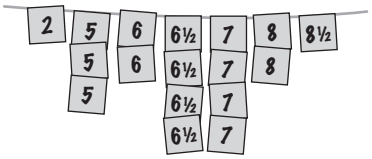
Current Topics

This chapter sets the stage for the exciting mathematical journey ahead. Students begin their study with an exploration of representations of data. Each of these representations will be revisited throughout the remainder of this course, with increasing levels of depth.

Much of the mathematics students will learn this year requires students to model a quantity and its relationship to other quantities. Rather than jumping straight to an algorithm, the focus at this stage is on developing more concrete models of the mathematical concepts. By doing so, students can deepen their understanding as they build their skill and fluency in mathematics.

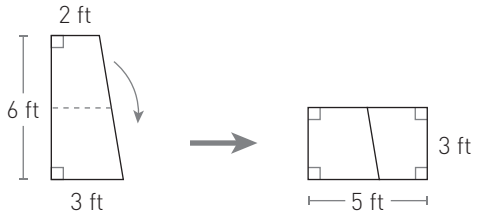
Numbers and Data (Section 1.1)

A clothesline is used to introduce students to the mathematical representation of a number line. This gives students a memorable experience to ground their work in the number line model for the rest of the course and beyond. Repeated values on a clothesline are a precursor for histograms, which students also create in this section.



Shapes and Area (Section 1.2)

Students apply prior knowledge to determine the area of composite figures by rearranging them into more familiar rectangles. Formulas to calculate the area of triangles and non-rectangular quadrilaterals will be developed in future chapters.



Expressions (Section 1.3)

This section moves away from the concrete representations of number lines and rectangles to a more abstract representation of numeric expressions. This section lays the groundwork for the development of variable expressions and equations, which will be formally introduced in Chapters 8 and 9.

Try This at Home!

Students will see many data displays this year, and discuss what they do and do not reveal. Share a graph (such as a histogram or bar graph) from a news article or other source, and talk with your student about how the graph tells a story.

Tools and Topics

Inspiring Connections Course 1, Chapter 2

Spotlight On: Understanding Over Time

Anyone can be a "math person;" every person's brain grows and can learn new things. There will be some topics that your student understands quickly and some concepts that they may take longer to become comfortable with. This means that students should not be expected to attain a thorough understanding of a concept when it is first introduced. When a new topic is introduced in the course, there will be several problems to do for practice. Subsequent lessons and homework assignments will continue to practice the concept or skill over weeks and months so that students develop a thorough understanding over time.

The Big Picture

Growing From

Fraction and decimal operations

Working On

Solving ratio problems; Converting units

Growing To

Calculating unit rate; Converting between fractions, decimals, and percents

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

2.1.1: Multiplying Multi-Digit Decimals
2.1.3: Ratios
2.2.1: Venn Diagrams
2.2.2: Equivalent Measures
2.2.6: Dakabibi

Current Topics

Chapter 2 begins with an introduction to creating and understanding ratios, which were briefly introduced in Chapter 1. Mathematical vocabulary introduced in this chapter will help students discuss the ratios they are working with. Students will build on the foundation of number lines developed in Chapter 1 to create double number lines for determining equivalent ratios. Students will see rates and ratios again in Chapter 4, where they will learn about percents and unit rates.

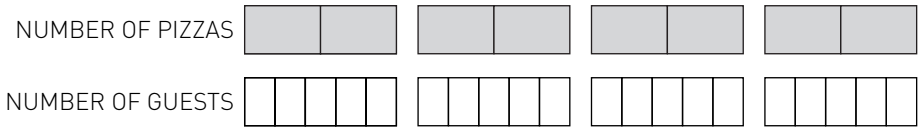
Ratio Language (Section 2.1)

Students are introduced to ratios. A **ratio** is a comparison between two quantities. Ratios can be represented in several ways, such as those shown here.

The ratio of circles to triangles is 3 to 4. 3:4 $\frac{3}{4}$

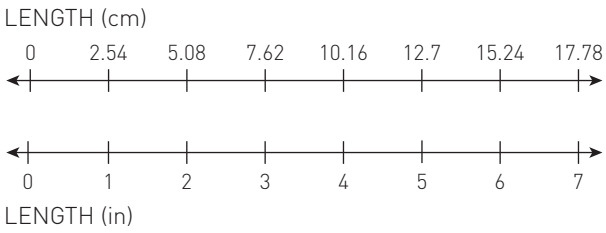
Equivalent Ratios (Section 2.2)

Students begin to write equivalent ratios by converting recipes. They are introduced to double number lines and tape diagrams to compare quantities. In the example shown, students start off by knowing that two pizzas will feed five guests. They complete the tape diagram to see that 20 guests will require 8 pizzas.



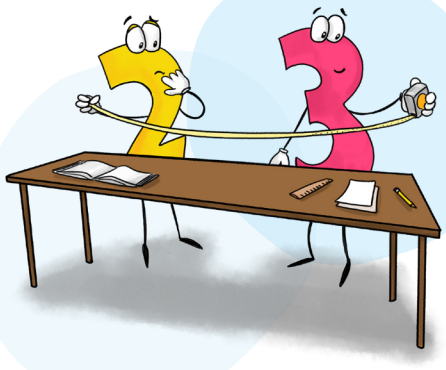
Measurement (Section 2.3)

Units of measure are introduced in this section. This provides students with another context in which to practice their new ratio skills. For example, students use a double number line to represent the measurements on a ruler as shown.



Try This at Home!

In this chapter, students used ratios to compare and convert units of measurement including inches, feet, centimeters, and others. What are some common units of measurement you use regularly? Talk about the different units with your student as you notice them around the house or out and about.



Tools and Topics

Inspiring Connections Course 1, Chapter 3

Spotlight On: Perseverance

People are rarely proficient when they first try something new—whether it is riding a bike, speaking a new language, or playing a new video game. Learning is about acquiring new skills, knowledge, or ways of understanding. Being unsure, identifying errors, and making mistakes are signs that someone is actively thinking about, and making sense of, new ideas and skills; they are signs that someone is learning and growing.

The National Council of Teachers of Mathematics (NCTM) highlights that math students (and mathematicians) learn by making sense of problems and persevering in solving them. CPM teachers are trained to invite students to engage with challenges productively. Students are encouraged to take risks, try new ideas, and learn from their mistakes.

The Big Picture

Growing From
Data Displays;
Number Lines

Working On
Measures of Center;
Integers;
Absolute Value;
Coordinate Plane

Growing To
Variation in Data Displays;
Coordinate Plane

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

3.1.1: Measurement Conversions
3.1.4: Measures of Central Tendency
3.2.3: Integers
3.2.4: Rational Numbers
3.3.3: Absolute Value
3.4.1: Opposites
3.4.2: Graphing Points on a Coordinate Plane

Current Topics

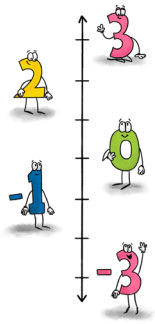
This chapter introduces students to several concepts and skills that will be used this year: measures of center (mean and median), negative numbers, and the coordinate system. Statistical topics will be revisited in Chapter 5 where students will more fully describe the variation of data. Following this chapter's introduction to negative numbers, students will see contextual problems throughout this course that solidify their understanding of negative numbers. They will begin operations on negative numbers (such as adding and subtracting) in a future course. The coordinate system will be a recurring theme as students practice graphing numbers, building up to work with distances between points in Chapter 10.

Measures of Center (Section 3.1)

Students will learn to describe a set of data by its measure of center through either the mean or the median. They will also be introduced to range and outliers.

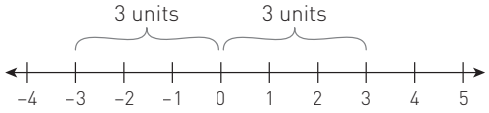
Integers (Section 3.2)

Students discuss contexts such as yardage in a football game and temperature to help build an understanding of zero and positive and negative numbers. Negative numbers are not as physically relatable to students as counting numbers (1, 2, 3...) are, so they are given multiple analogies and plenty of time to develop this foundation.



Absolute Value (Section 3.3)

Many students think that the absolute value symbol simply makes the number positive (negative becomes positive and positive stays a positive), when in fact the absolute value of a number is the distance of the number from zero. Because distance measured is always a positive number, the absolute value of a number will always be positive.

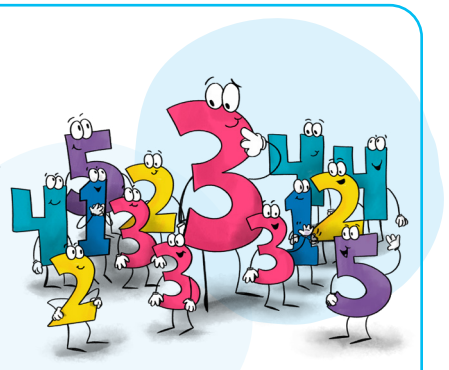


Coordinate Plane (Section 3.4)

The coordinate plane is introduced as an extension of the number line and a means to identify a location on a two-dimensional space. Students will explore movement in the four quadrants and add to their understanding of negative numbers by graphing positive and negative coordinates on the plane.

Try This at Home!

Negative numbers may be unfamiliar to your student, but they are an important part of our number system and our world. Show your student a thermometer that has negative values and talk about the weather. Do you live in or have you ever visited a place with a temperature less than 0 °F? Look at a national weather report together and look for a location where the temperature is negative.



Tools and Topics

Inspiring Connections Course 1, Chapter 4

Spotlight On: Making Mistakes

Did you know you can learn by making mistakes? Some mistakes are worth celebrating! Spencer Silver tried to make a super-sticky glue when he worked for 3M laboratories in 1968, but the glue he made was actually not very sticky at all. He did not succeed in his initial goal, but many years later, his formula was used on Post-It notes!

Mistakes are a necessary part of progress. Reflecting on mistakes leads to deeper understanding. At home, pause to embrace and learn from mistakes.

The Big Picture

Growing From
Comparing Ratios

Working On
Equivalent Ratios;
Percents;
Unit Rates

Growing To
Solving Distance, Rate, and Time Problems

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

4.1.1: Equivalent Ratios
4.1.2: Multiplicative Identity
4.1.3: Representing Portions with Base Ten Blocks
4.1.4: Adding and Subtracting Fractions
4.2.1: Portions Web
4.3.1: Percents
4.3.4: Rates and Unit Rates

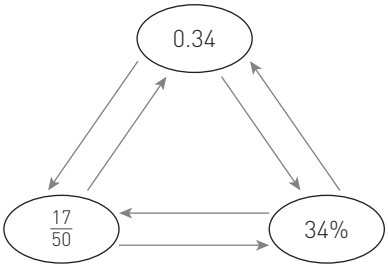
Current Topics

Ratios were introduced in Chapter 2, and students practiced writing and comparing ratios in the Reflection & Practice in Chapter 3. In this chapter, they will further investigate this topic, and expand their thinking to include equivalent ratios, percents, and unit rates. Students will use a variety of visual representations to convert, compare, and calculate with ratios. They will continue to work with unit rates in Chapter 9, when they will use them to solve equations.

Fractions, Decimals, and Percents (Section 4.1)

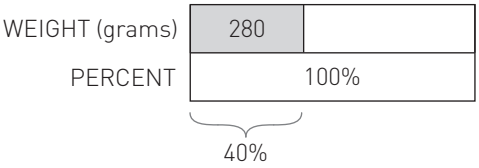
$$\frac{3}{5} = \frac{3}{5} \cdot \boxed{\frac{20}{20}} = \frac{60}{100} = 60\%$$

Students use a Giant One and a Proportions Web to work with fractions, decimals, and percents. Students use the "Giant One" to calculate equivalent fractions as shown. Since the fraction $\frac{20}{20}$ is equivalent to 1, it is called a Giant One. Students use a Portions Web to help organize their understanding of the relationships between fractions, decimals, and percents. The Portions Web shown displays the connections between the different representations for 34%.



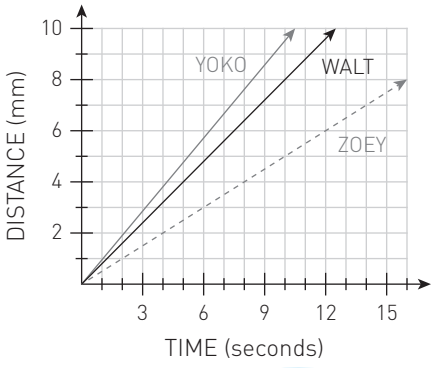
Percents (Section 4.2)

Tape diagrams, ratio tables, and double number lines are tools students use to model situations involving ratios and percents. The tape diagram shown could be used by students to answer the question, *If 280 grams is 40% of the weight of a loaf of bread, what is the weight of the entire loaf?*



Unit Rates in Tables and Graphs (Section 4.3)

Graphs help students visualize and compare rates and identify unit rates. A unit rate is a ratio that compares a first quantity to one unit of a second quantity. Students can use the graph shown to conclude that Yoko is traveling at the fastest rate because at any point in time, Yoko has traveled farther than the others.



Try This at Home!

Find an advertisement with a percent-off sale and ask your student to estimate the savings for a variety of items. For example, in the image shown, the sale is buy one, get one 50% off. If the item costs $40 full price, you would save $20 with this sale if you buy two.

Tools and Topics

Inspiring Connections Course 1, Chapter 5

Spotlight On: Active Learning

Can you imagine learning how to play the flute by going to a concert? Or watching a basketball game and then going home and thinking you will make every shot you attempt? Being an expert takes more than watching an expert. In the same way, students need to actively engage with mathematics in order to learn to think like a mathematician. In class, students are actively engaging with mathematics together for the majority of class time. It is valuable to have conversations at home about what your student is learning in math class and to show interest and curiosity towards what they are learning about.

The Big Picture

Growing From

Fractions, decimals, and percents;
Measures of center

Working On

Fractions;
Area;
Statistical questions and data

Growing To

Decimals and fractions;
Surface area;
Mean absolute deviation

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

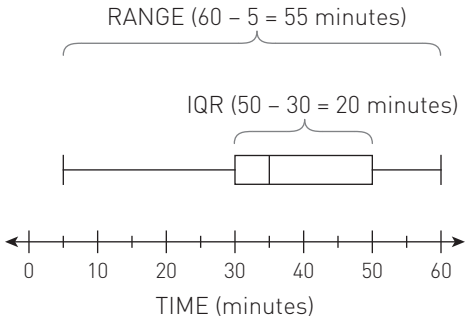
5.1.3: Box Plots
5.1.4: Quartiles and Interquartile Range (IQR)
5.2.1: The Shape of Distributions
5.2.2: Parallelogram Vocabulary
5.2.4: Area of a Parallelogram
5.2.5: Area of a Triangle
5.2.7: Area of a Trapezoid
5.3.3: Multiplying Fractions

Current Topics

In Chapter 3, students described data distributions by calculating measures of center. This chapter extends descriptions of data to include variation of the data, called "spread." Students will revisit statistics in Chapter 10 with an introduction to mean absolute deviation. In addition to learning more about data, students continue to learn about area, with the formal introduction of methods to calculate the area of triangles and various quadrilaterals. A model based on calculating the area of a rectangle is used in the final section of this chapter to help students understand the multiplication of fractions and mixed numbers, as well as preparing them to divide fractions in Chapter 7.

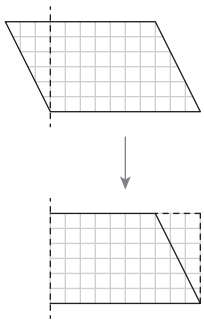
Variation in Data (Section 5.1)

This section introduces students to box plots. A box plot separates data into four quartiles. In addition to calculating the range of the data (from the lowest value to the highest), students will learn how to calculate the range of the middle 50% of the data, called the "interquartile range" (IQR).



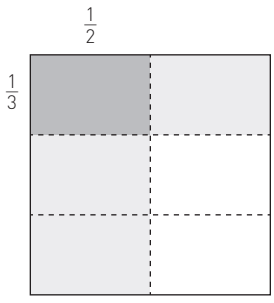
Area (Section 5.2)

In this section, students will use the dissection techniques introduced in Chapter 1 to study the area of triangles, parallelograms, and trapezoids. While the base and height of rectangles are fairly straightforward to identify, determining the base and height of other shapes requires some mental flexibility. The focus is less on recalling area formulas and more on rearranging shapes into more familiar shapes. For example, students will turn a parallelogram into a rectangle using the technique shown at right.



Fractions (Section 5.3)

In this section, students will use the familiar area of a rectangle model as a structure for multiplying fractions. In the example shown, the large rectangle represents one whole. The side of the rectangle is divided into three equal parts and the top of the rectangle is divided into two equal parts. The top left portion of the rectangle represents the product of $\frac{1}{3}$ and $\frac{1}{2}$.



$\frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$

Try This at Home!

Think about a time when you need to know a fraction of a fraction. For example, if you need half an hour to clean the basement, and are only one third of the way finished, you still need 20 minutes to finish cleaning.

Tools and Topics

Inspiring Connections Course 1, Chapter 6

Spotlight On: Communication

Mathematicians construct viable arguments and critique the reasoning of others. The ability to communicate mathematical ideas is vital for students to grow as mathematicians themselves. Moreover, clear and open communication is necessary for success in any collaborative working environment. Your student's teacher will help students develop communication skills by using structures such as the *Dyad*, where each student has a set amount of time to explain their thinking. In this way, students learn to listen and ask thoughtful questions to help in their team communication.

The Big Picture

Growing From
Numerical expressions

Working On
Exponents;
Order of Operations;
Multiples and factors;
Distributive Property

Growing To
Algebraic expressions;
Distributive Property

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

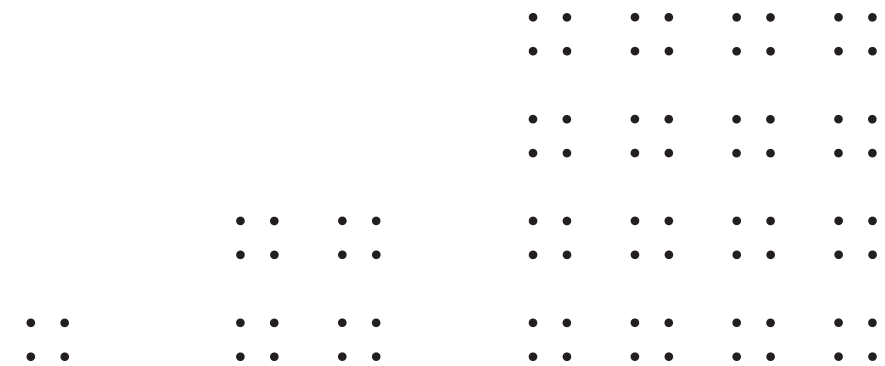
6.1.1: Multiplying Mixed Numbers
6.1.2: The Vocabulary of Algebraic Expressions
6.2.1: Order of Operations
6.2.2: Least Common Multiple
6.2.3: Conjecture and Justify
6.2.6: Greatest Common Factor
6.2.7: Distributive Property

Current Topics

The vocabulary introduced in this chapter is an important part of mathematical communication for students as they work together to write expressions with numbers in this chapter and with variables in future chapters. The Giant One and unit rates introduced in Chapter 4 reappear in this chapter as students work with factors and multiples. Students will use the pattern skills they discussed in Chapter 1 to look for and make conjectures about patterns in multiples. The number fluency they are developing as they work with all forms of numbers in this chapter will help them as they move toward writing and evaluating algebraic expressions in Chapters 8 and 9.

Rules of Operations (Section 6.1)

A primary focus of this section is numerical expressions. A numerical expression conveys an idea through numbers and mathematical operations. For example, students will work with exponents visually as shown.



4 represents the number of dots in the first image.

4×4 or 4^2 represents the number of dots in the second image.

$4 \times 4 \times 4$ or 4^3 represents the number of dots in the third image.

Multiples and Factors (Section 6.2)

In this section, students will explore a classic dilemma: why is the number of hot dogs in a package different from the number of hot dog rolls in a package? To solve this problem, they will develop methods to determine the least common multiple. Later in the section, they learn to determine the greatest common factor of two or more numbers, and they apply this knowledge as they use the Distributive Property.

Try This at Home!

In this course, students are often encouraged to discuss strategies for doing mental math. Ask your student to explain to you how they might add numbers such as 112 and 234 in their head, and share your own strategies as well. Talking with you about math will help your student strengthen their communication skills.

Tools and Topics

Inspiring Connections Course 1, Chapter 7

Spotlight On: Problem Solving

Throughout this course, students have been learning many different ways to solve problems. Having this flexibility can transfer to many other situations where they will need to use critical thinking skills to solve problems. This chapter presents multiple ways to think about division and students are encouraged to consider which methods make the most sense to them.

The Big Picture

Growing From

Adding and subtracting rational numbers;
Representing a quotient with a remainder

Working On

Long division;
Dividing fractions

Growing To

Solving real-world problems with rational expressions

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

7.1.3: Dividing
7.2.6: Multiplicative Inverses and Reciprocals

Current Topics

In this chapter, students will learn about division with fractions and decimals. The early lessons in this chapter have students make sense of fraction division in a context in order to help them develop their understanding before thinking about it abstractly.

Whole Number and Decimal Division (Section 7.1)

In the mathematical sentence, $52 \div 3 = 17\frac{1}{3}$, 52 is called the dividend, 3 is the divisor, $17\frac{1}{3}$ is the quotient, where $\frac{1}{3}$ is the $\frac{\text{remainder}}{\text{divisor}}$. Students learn the standard long division algorithm by using repeated subtraction to mimic repeated addition that students used to understand multiplication.

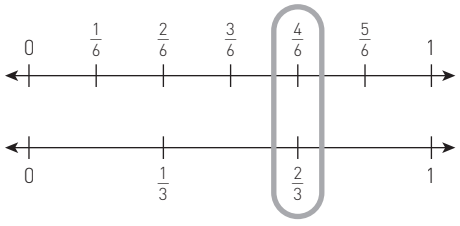
$1{,}235 \div 5$

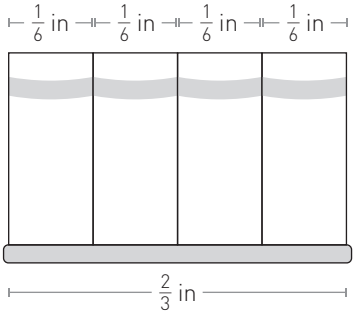
$$\begin{array}{r} 247 \\ 5\overline{)1{,}235} \\ -\,1{,}000 \\ \hline 235 \\ -\,200 \\ \hline 35 \\ -\,35 \\ \hline 0 \end{array}$$

$1{,}235 \div 5 = 247$ because $247 \times 5 = 1{,}235$

Fraction Division (Section 7.2)

Students will divide fractions by fractions using several methods. Developing a visual model of division will help students more intuitively predict a quotient as a number larger or smaller than the dividend. For example, in Lesson 7.2.3, students could use a double number line to visualize $\frac{2}{3}$ as $\frac{4}{6}$, or use a bookshelf model to represent a $\frac{2}{3}$-inch space on a shelf holding four $\frac{1}{6}$-inch wide books to illustrate the equation $\frac{2}{3} \div \frac{1}{6} = 4$.





Additionally, in Chapter 4, students used a Giant One to rewrite fractions. This important tool reappears in this chapter to help students divide fractions by fractions as shown.

$$\frac{5}{8} \div \frac{3}{4} = \frac{\frac{5}{8}}{\frac{3}{4}} \cdot \left[\frac{\frac{4}{3}}{\frac{4}{3}}\right] = \frac{\frac{20}{24}}{1} = \frac{5}{6}$$

Try This at Home!

Do you like to cook or bake at home? Invite your student to help, and notice together how many fractions are used in measurements of ingredients in a recipe. Ask your student how you could increase or decrease the number of servings a recipe uses, and talk about the connections this makes to what they are learning in school.

Tools and Topics

Inspiring Connections Course 1, Chapter 8

Spotlight On: Setting Goals

It is really difficult to get somewhere if you do not know where you want to go. Throughout the year, students have been setting goals for their mathematical journey in their journals. They have probably reached or exceeded some goals, and are still working on others. This is all part of the journey. Now might be a great time to check in and ask your student what their goals are for the rest of this school year!

The Big Picture

Growing From
Order of Operations;
Exponents

Working On
Algebraic expressions;
Writing equations and inequalities;
Distributive Property

Growing To
Solving equations and inequalities

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

8.1.1: Fraction Division
8.1.3: Algebra Tiles
8.1.4: Distributive Property with Variables
8.1.6: Combining Like Terms
8.2.3: Using Variables to Generalize
8.3.1: Evaluating Algebraic Expressions

Try This at Home!

Throughout this course, students have solved many Dakabibi puzzles, like the one shown. Ask your student how a Dakabibi works, and make one up to solve together. One possible solution for the Dakabibi shown is $7 + 9 \cdot 3 = 34$.

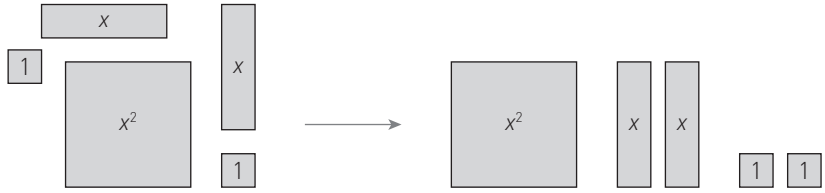
$\square + \square \cdot \square = 34$

Current Topics

In Chapter 1, students worked with numerical expressions to represent a variety of situations, such as oranges in a lunchbox and groups of pennies and dice. Since then, they have worked with numbers in all sorts of forms: whole numbers, decimals, percents, fractions, and mixed numbers. This chapter takes everything students know about numbers and puts it into the context of expressions. Variables are added to the mix to represent unknown numbers, and the journey towards algebra continues to build.

Algebra Tiles (Section 8.1)

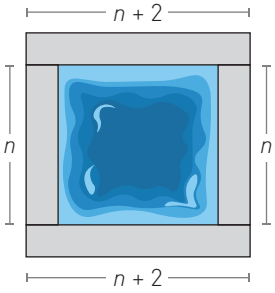
This section introduces students to algebra tiles, which will be used throughout CPM courses. Algebra tiles serve as a bridge between concrete experiences students have had with numbers and the abstract world of algebra. Algebra tiles are engaging and accessible, allowing students to represent algebraic expressions with a visual, hands-on model. Each tile represents a term, such as x, 1, or x^2, and when tiles are grouped, students can form equivalent expressions or rewrite an expression by combining like terms.



$1 + x^2 + x + 1 + x$ $\qquad$ $x^2 + 2x + 2$

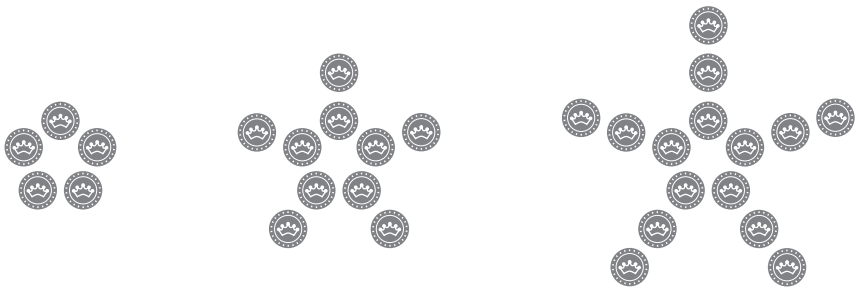
Expressions (Section 8.2)

In this section, students use expressions, both numeric (those with only numbers) and algebraic (those with both numbers and variables), to solve problems involving patterns in a variety of contexts, such as tiles around a pool.



Equations and Inequalities (Section 8.3)

The chapter uses patterns familiar from earlier in the course to preview equations and inequalities. For example, students work with patterns made from game pieces, as shown. This will prepare students for the work they will do solving equations in Chapter 9.



Tools and Topics

Inspiring Connections Course 1, Chapter 9

Spotlight On: Memory

The memory pathways in the brain are similar to hiking trails: the more a pathway is used and walked upon, the easier it is to follow. One way to build a memory path is to reflect on learning. Students have been writing in a reflection journal this year, not only to have a place to refer back to prior learnings, but also to allow their brains to consolidate new memories as they are formed. The act of writing something down gives the brain the opportunity to interact with information in a new way, increasing higher-level thinking and ownership of their mathematical learnings. Writing in a journal may be new to your student this year, but it is a skill they can take with them as they continue as lifelong learners.

The Big Picture

Growing From
Algebraic expressions

Working On
Rates;
Equations;
Inequalities

Growing To
Proportional relationships;
Equations and Inequalities

Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

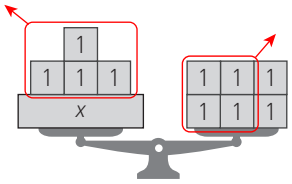
9.1.6: Solving Equations
9.1.7: Solutions to Inequalities
9.2.3: Distance, Rate, and Time

Current Topics

This chapter draws upon the work with ratios and rates that students did in Chapters 2 and 4, as well as the work with variables and equations they did in Chapter 8. In future courses, students will have opportunities to further develop these skills as they prepare for the formal study of algebra.

Equations and Inequalities (Section 9.1)

In this section, students will model equations in various ways to help them visualize what the solution means, such as the balance scale shown in the image below. They will first use their intuition to determine what the value of the variable is. Gradually, they will learn to use inverse operations. Inverse operations are operations that undo each other, such as addition and subtraction or multiplication and division.



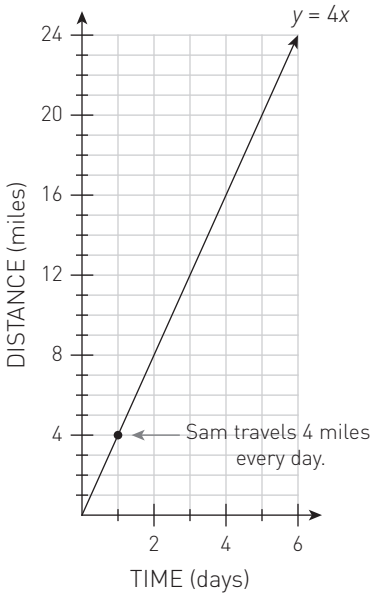
$$x + 4 = 6$$
$$x + 4 - 4 = x + 6 - 4$$
$$x = 2$$

Rate Problems (Section 9.2)

In this section, students will calculate and compare rates in contexts using different representations. Students will represent rates using tables, equations, graphs, and descriptions. They will combine this concept with equation solving from Section 9.1, with a primary focus on the relationship $d = rt$, or "distance equals rate times time." In the examples below, the rate is 4 miles per day.

Time (days)	Distance (miles)
2	8
4	16
6	24
x	y

8 miles in 2 days



Try This at Home!

What is something you and your student both do that takes you different amounts of time? For example, running or biking. Ask your student to help you calculate and compare your rates!

Tools and Topics

Inspiring Connections Course 1, Chapter 10

Spotlight On: Fostering Curiosity

This year, your student's teacher has been working to foster curiosity by encouraging students to think about mathematics and the world in new ways. The explorations that result from students' questions promote higher-order thinking through analyzing, evaluating, and creating new ideas.

The Big Picture

Growing From

Number lines;
Integers;
Area;
Measures of center

Working On

Coordinate plane;
Surface area;
Volume;
Mean absolute deviation

Growing To

Cross sections;
Statistical calculations

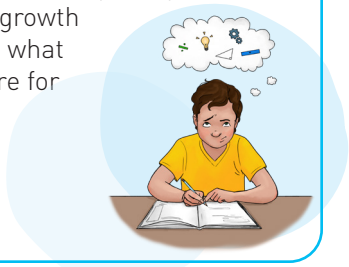
Need Help?

Methods & Meanings boxes are included in the Mathematician's Notebook as reference.

10.2.3: Prisms and Pyramids
10.2.4: Surface Area and Nets
10.2.5: Measurement in Different Dimensions
10.2.6: Volume of a Prism
10.3.3: Mean Absolute Deviation

Try This at Home!

As the end of this course approaches, take some time to look through your student's goal journal together. Ask your student what ways they have experienced growth this year and what their goals are for next year.

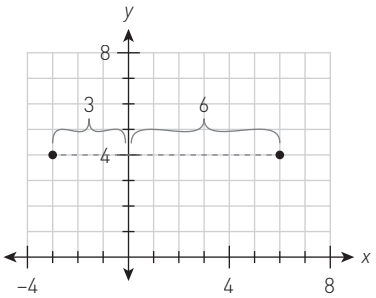


Current Topics

In this chapter, students will apply the graphing, geometry, and statistical skills and tools they acquired in earlier chapters to measure distance on a coordinate plane, calculate the volume and surface area of prisms and pyramids, and determine the mean absolute deviation of a dataset.

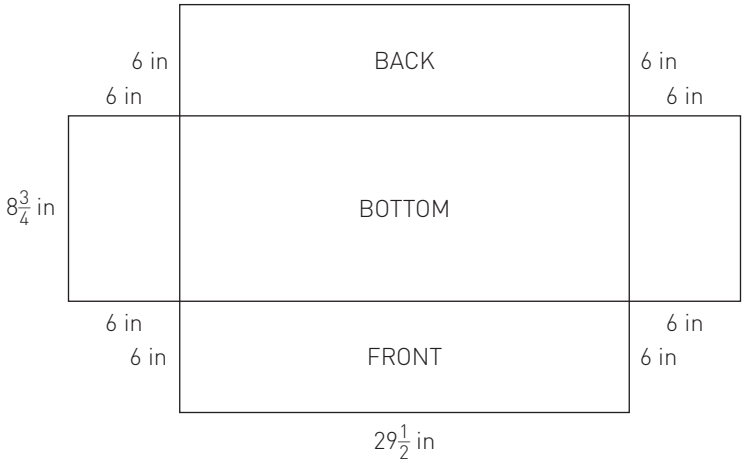
Two Dimensions (Section 10.1)

In this section, students will calculate vertical or horizontal distances on a coordinate plane.



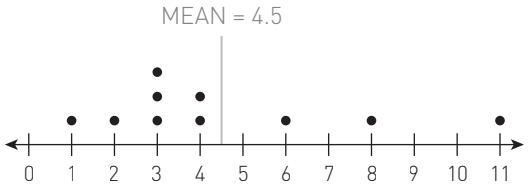
Three Dimensions (Section 10.2)

In this section, students use nets to investigate properties of prisms and pyramids. A net is the flat surface obtained by "unwrapping" a solid. Several examples are shown in the Methods & Meanings box in Lesson 10.2.4. Students will use a solid's net and their knowledge of areas of two-dimensional shapes to determine the surface area of a solid, then use that knowledge to calculate volume as well.

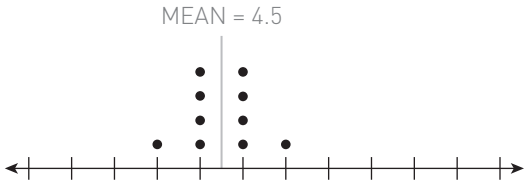


More Data (Section 10.3)

In this section, students learn how to measure variability of data by calculating the mean absolute deviation (MAD). "Mean" is another word for "average," and "deviation" is the distance from a data point to the average of all the data. MAD measures the average distance of the data points from the mean, so a higher MAD implies data that is more spread out.



HIGH MAD
(data spread away from mean)



LOW MAD
(data close to mean)