

Dimensions Math

Grade 5 Letter Home #9

Chapter 9 Decimals

Dimensions Math
Letters Home

Home Connection

In Chapter 9, your child will learn about decimals to the thousandths place. This builds on their Dimensions Math 4 work with decimals to the hundredths place. They will also learn about the relationship and connectedness of decimals and fractions.

Your child will learn that decimals to the thousandths place can be expressed as fractions with a denominator of 10, 100, or 1,000.

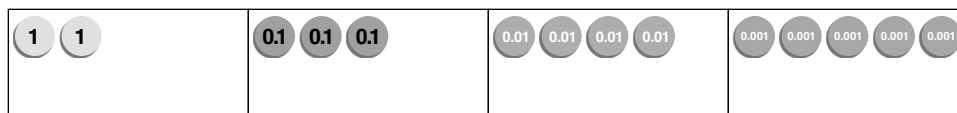
Examples:

$$0.5 = \frac{5}{10}$$

$$0.25 = \frac{25}{100}$$

$$0.364 = \frac{364}{1,000}$$

Decimal numbers are shown in the classroom with place-value discs, similar to whole numbers: 2.345



In expanded form, the value of each digit is given:

Ones	Tenths	Hundredths	Thousandths
2	3	4	5
↑ 2×1	↑ 3×0.1	↑ 4×0.01	↑ 5×0.001

$$2 + 0.3 + 0.04 + 0.005$$

Your child will extend their knowledge of converting certain fractions to decimals by first finding an equivalent fraction with a denominator of 10, 100, or 1,000.

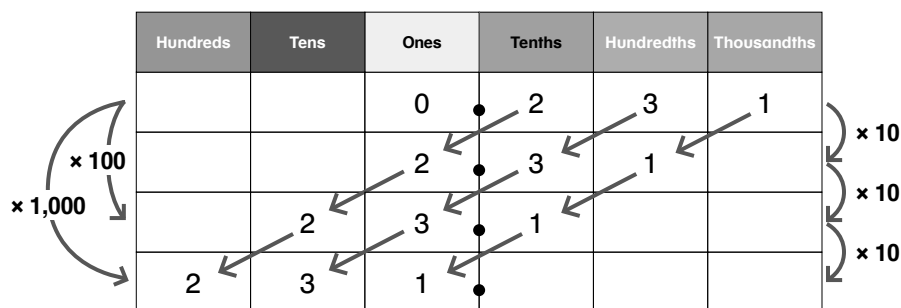
Examples:

$$\frac{1}{2} = \frac{5}{10} = 0.5$$

$$\frac{3}{8} = \frac{375}{1,000} = 0.375$$

Students will learn how to compare and round decimals to the hundredths, tenths, and ones by looking at the digit in the next lower place, as they did for whole numbers.

Your child will multiply and divide decimals by 10, 100, or 1,000. When multiplying by 10, 100, or 1,000, the digits move to the left on a place-value chart 1, 2, or 3 places, respectively. When looking at the decimals, this makes it appear as though the decimal point is moving to the right 1, 2, or 3 places.

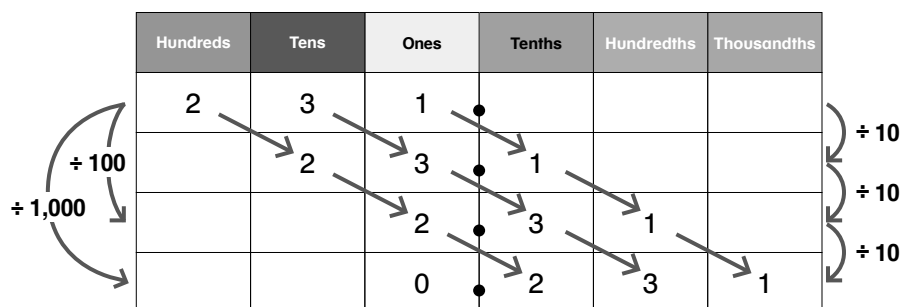


$$0.231 \times 10 \rightarrow 0.231 \rightarrow 2.31$$

$$0.231 \times 100 \rightarrow 0.231 \rightarrow 23.1$$

$$0.231 \times 1,000 \rightarrow 0.231 \rightarrow 231$$

Similarly, when dividing by 10, 100, or 1,000, the digits move to the right, and the decimal point appears to move to the left.



$$231 \div 10 \rightarrow 231. \rightarrow 23.1$$

$$231 \div 100 \rightarrow 231. \rightarrow 2.31$$

$$231 \div 1,000 \rightarrow 231. \rightarrow 0.231$$

Your child will take this deep understanding of decimal place values one step further as they learn to multiply and divide by multiples of 10, 100, or 1,000. They can do the basic calculation first and then place the decimal between the ones and the tenths.

For example:

$$0.09 \times 70$$

$$9 \text{ hundredths} \times 7 \times 10 = 630 \text{ hundredths} \\ = 6.30$$

$$1.2 \div 400$$

$$12 \text{ tenths} \div 4 \div 100 \\ = 3 \div 100 = 0.3 \div 100 \\ = 0.003$$

What can we do at home?

- Decimals can be fun to practice at home because they can be found everywhere we look. Grocery stores, gas station signs, and coupon mailers are some examples. Ask your child to read the decimals aloud, using tenths, hundredths, and thousandths appropriately. This will be great practice.
- You can make the above practice a bit more challenging by asking your child to use mental math to determine the value of the decimal if it were 10, 100, or 1,000 times greater or less.

Dimensions Math

Grade 5 Letter Home #10

Chapter 10 The Four Operations of Decimals

Dimensions Math
Letters Home

Home Connection

In this chapter, your child will learn how to add, subtract, multiply, and divide decimals. They should be able to fluently add and subtract decimals to the hundredths place already, remembering to regroup when necessary. Now, students will extend their knowledge to three decimal places, or the thousandths.

In Grade 4, your child learned how to multiply a decimal by a whole number. In Grade 5, they will learn how to multiply a decimal by a decimal. They will see two methods that show how the more common algorithm works; multiply the decimals as if they are whole numbers and then count decimal places in both factors.

$$2.5 \times 0.9$$

Method 1

$$\begin{aligned} 2.5 \times 0.9 &= \frac{25}{10} \times \frac{9}{10} \\ &= \frac{25 \times 9}{100} \\ &= \frac{225}{100} \\ &= 2.25 \end{aligned}$$

Method 2

$$\begin{aligned} 2.5 \times 0.9 &= (25 \times 0.1) \times (9 \times 0.1) \\ &= (25 \times 9) \times (0.1 \times 0.1) \\ &= 225 \times 0.01 \\ &= 2.25 \end{aligned}$$

Method 3

25×9 is 100 times as much as 2.5×0.9 .

$$\begin{array}{r} 2.5 \xrightarrow{\times 10} 25 \\ \times 0.9 \xrightarrow{\times 10} \times 9 \\ \hline 2.25 \xrightarrow{\times 100} 225 \\ \div 100 \end{array}$$

Multiply decimals the same way as whole numbers. Place a decimal point in the product according to the number of decimal places being multiplied.

$$\begin{array}{r} 2.5 \leftarrow 1 \text{ decimal place} \\ \times 0.9 \leftarrow 1 \text{ decimal place} \\ \hline 2.25 \leftarrow 2 \text{ decimal places} \end{array}$$



Your child will learn to divide decimals using the standard division algorithm that they are used to. When dividing a decimal by a whole number, they will sometimes need to add some zeros to the dividend to complete the problem. Students will round decimal answers to the third decimal place, or thousandths.

$$\begin{array}{r} 0.075 \\ 4 \overline{)0.300} \\ \underline{28} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

Next, your child will learn two methods for dividing a whole number by a decimal. The process is the same whether they are dividing a whole number by a decimal or a decimal by a decimal. The first method is to turn the decimals into fractions and then divide.

This method works well for some calculations that are easy to do with mental math.

$$\begin{aligned} 6 \div 0.5 &= 6 \div \frac{5}{10} \\ &= 6 \times \frac{10}{5} \\ &= 6 \times 10 = 12 \\ &= 5 \end{aligned}$$

The second method is to multiply both the dividend and the divisor by either 10 or 100 prior to solving so that students are calculating with whole numbers. Dividing the dividend and the divisor by the same number does not change the answer.

$$\begin{array}{r} 12 \\ 0.5 \overline{)6.0} \longrightarrow 5 \overline{)60} \end{array} \qquad \begin{array}{r} 0.35 \overline{)209.00} \longrightarrow 35 \overline{)20900.00} \\ \underline{175} \\ 340 \\ \underline{315} \\ 250 \\ \underline{245} \\ 50 \\ \underline{35} \\ 150 \\ \underline{140} \\ 100 \\ \underline{70} \\ 30 \end{array}$$

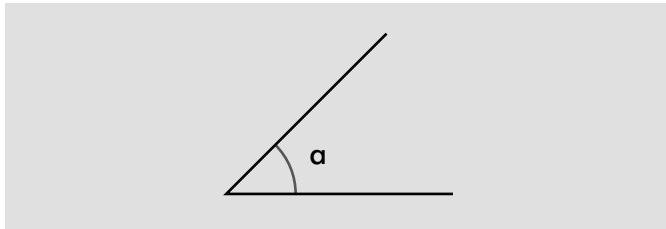
What can we do at home?

- Working through practice problems at home will be a great help. To ensure that the numbers are lined up properly, you can use large-square graph paper or lined paper turned sideways to create columns.

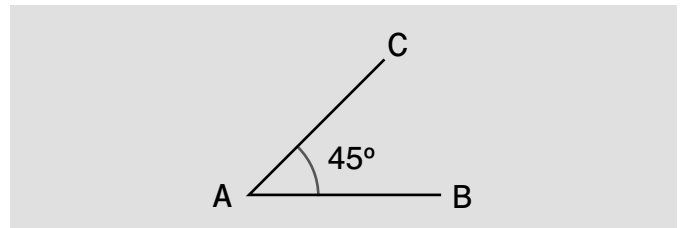
Home Connection

In Chapter 11, your child will deepen their understanding of the properties of geometric shapes. They will learn about some angle properties of triangles and quadrilaterals, and will review classifying quadrilaterals based on their properties.

Your child will learn that angles are named either with an arc and a lowercase letter, or an arc using the named points on each side and at the intersection (vertex).

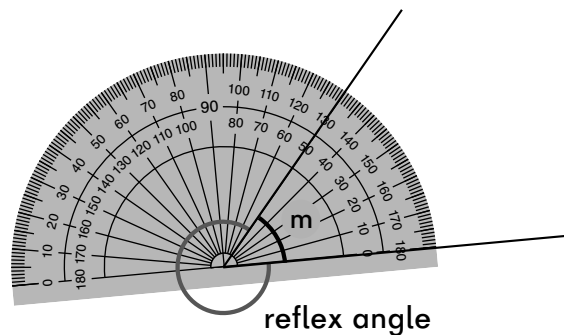


The above angle is referred to as $\angle a$.

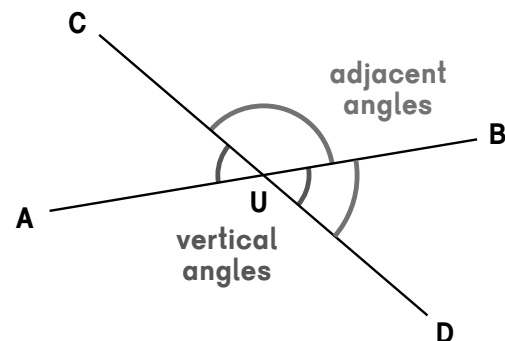


The above angle is referred to as $\angle BAC$ or $\angle CAB$.

Next, your child will learn how to measure angles with a protractor, and how to calculate reflex angles, which are greater than 180° .

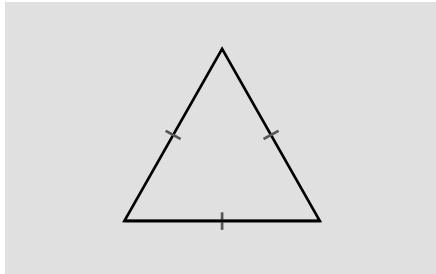


When lines intersect, angles are formed. Your child will learn about vertical and adjacent angles, and how to find the measure of an unknown angle given the measure of known angles. The straight lines that intersect are called straight angles. They measure 180° .

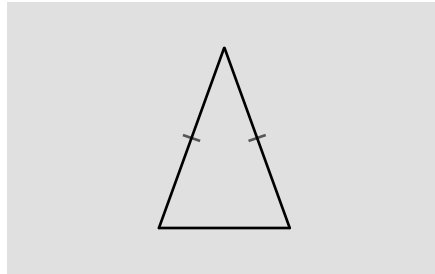


Your child will learn that the three angles within a triangle add up to 180° , and that triangles can be classified according to side lengths and angles.

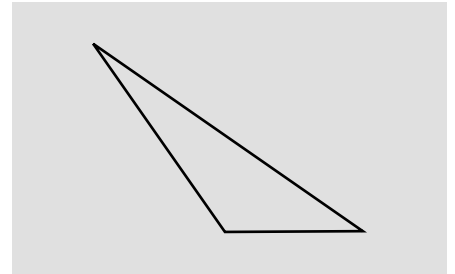
Triangles classified by side length:



equilateral triangle
3 equal length sides

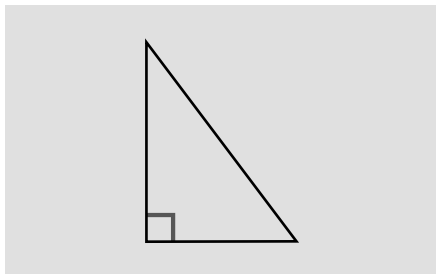


isosceles triangle
2 equal length sides

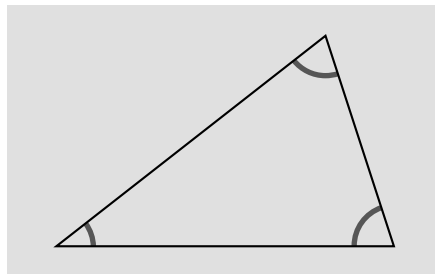


scalene triangle
no equal length sides

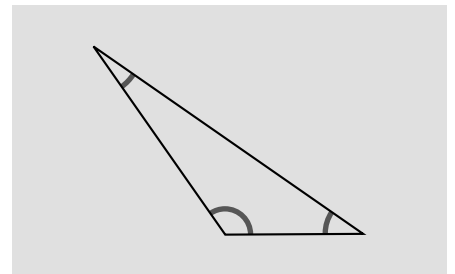
Triangles classified by angle measurement:



right triangle
has one 90° angle

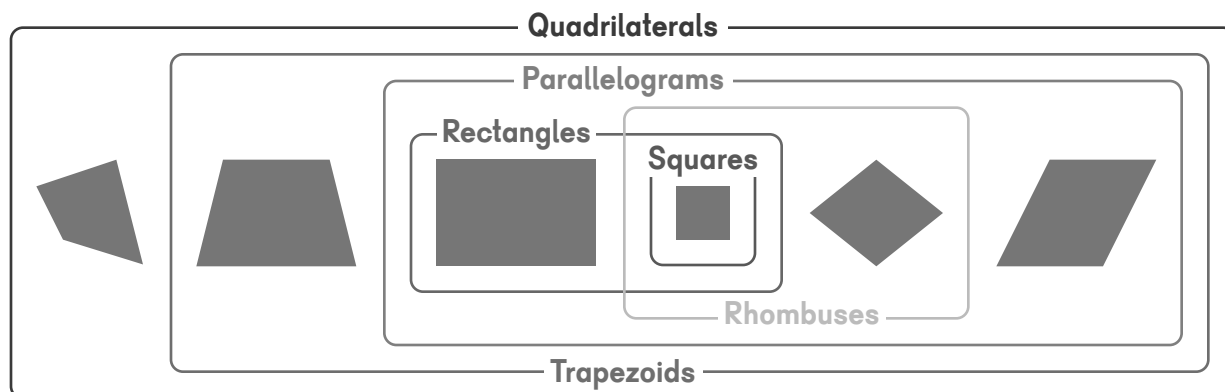


acute triangle
all 3 angles are less than 90°



obtuse triangle
one angle is greater than 90°

Knowledge of angles will then help your child classify quadrilaterals. This helpful graphic of the relationships among quadrilaterals may come in handy at home if your child has questions:



Finally, your child will learn that the four angles inside of a quadrilateral always add up to 360° , and that a quadrilateral can be split into two triangles, each of which are 180° . They will construct and arrange parallelograms in class to test this concept and will make discoveries that solidify their learning.

What can we do at home?

- Working through practice problems at home will be a great help. To ensure that the numbers are lined up properly, you can use large-square graph paper or lined paper turned sideways to create columns.

Home Connection

In Chapter 12, your child will learn how to find the average of a set of values. The information will be presented in the form of tables, graphs, and line plots. They will also learn how to find the missing value within a set when they are given the average and the rest of the values.

To calculate the average, all the numbers within a set of numbers are first added together. The total is then divided by how many individual numbers were added together. Here is an example that shows a set of grades on a quiz:

Quiz 1	9
Quiz 2	10
Quiz 3	8
Quiz 4	5
Quiz 5	8

Scores on First Quarter Quizzes

$$\begin{aligned}\text{Average Score} &= \text{Total Amount} \div \text{Number of Values} \\ &= (9 + 10 + 8 + 5 + 8) \div 5 \\ &= 40 \div 5\end{aligned}$$

$$\text{Average Score} = 8$$

To find a missing value within a set when the average is already known, your child will learn to multiply the average by the number of values that were added. In this example, the average score is 8.2.

Quiz 1	9
Quiz 2	7
Quiz 3	8
Quiz 4	8
Quiz 5	?

Scores on Second Quarter Quizzes

$$\begin{aligned}\text{Total Amount} &= \text{Average Score} \times \text{Number of Values} \\ &= 8.2 \times 5 \\ &= 41\end{aligned}$$

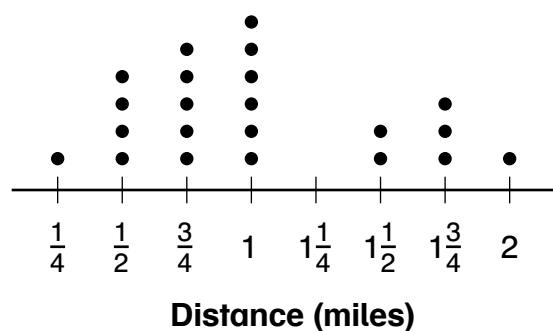
The sum of the 4 known values is $9 + 7 + 8 + 8 = 32$

The value of the missing score is $41 - 32 = 9$

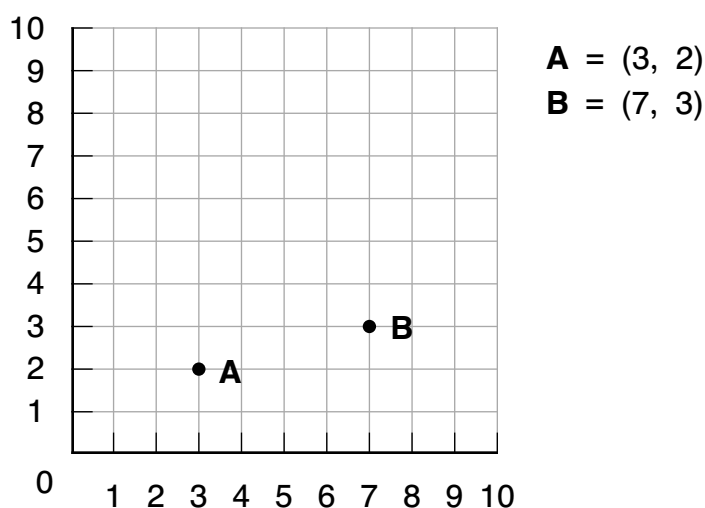
The missing value is 9.

Your child will review line plots and find averages of the data shown on a line plot. A line plot shows how many times (frequency) a piece of data occurs and is presented on a number line.

Distance Emma's Friends Live from School



Lastly, your child will learn how to plot ordered pairs on a coordinate graph, and how to interpret what the graph represents. Coordinate graphs have a horizontal x-axis and a vertical y-axis. An ordered pair is a set of two numbers in parentheses, such as (3, 2) or (7, 3). The first number is the horizontal distance from the y-axis. The second number is the vertical distance from the x-axis. Your child will learn to plot points on a coordinate graph by starting at the origin point of (0, 0), and traveling to the right and then up. The numbers in the ordered pair tell them how far to go in each direction.



What can we do at home?

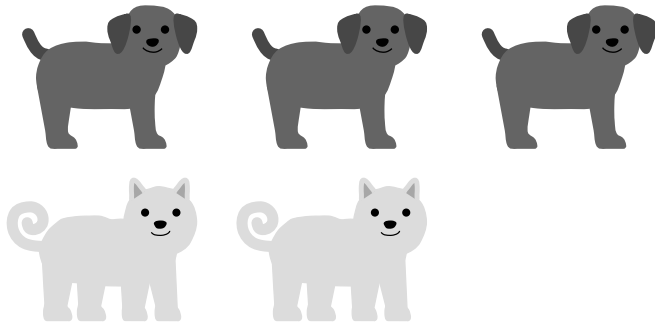
- Playing Battleship is a fun way to practice plotting points on a coordinate graph. You can use graph paper to make your own version of the game, making sure that all points are at line intersections and not open spaces.

Home Connection

In Chapter 13, your child will learn about ratios, equivalent ratios, and comparing three quantities with ratios. They will apply many skills that they have already learned: multiplication and division, measurement, and finding common factors to simplify a fraction.

Ratio

A ratio expresses the relative size of two or more quantities. For example: There are 3 brown dogs and 2 white dogs at the groomer.



The ratio of brown dogs to white dogs is $3 : 2$, which is read as “3 to 2.”

The 3 and the 2 are called the “terms” of the ratio.

This type of ratio is called a part-to-part ratio, and it indicates the relative sizes of the quantities involved, not the actual size. To compare a part to the whole, we would say 3 of every 5 dogs are brown, which is written $3 : 5$.

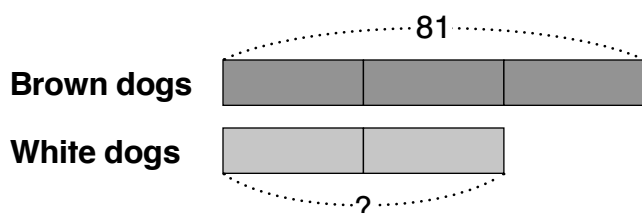
Equivalent Ratios

The ratio would still be $3 : 2$ if there were 6 brown dogs and 4 white dogs, or 18 brown dogs and 12 white dogs. $3 : 2$, $6 : 4$, and $18 : 12$ are equivalent ratios. Typically, ratios are expressed in simplest form.

Finding Ratio Quantities

Your child will learn how to find the value of one quantity or the total when given the ratio of two quantities.

Example: The ratio of brown dogs to white dogs at the doggie daycare was 3 : 2. There were 81 brown dogs. How many white dogs were there?



$$3 \text{ units} \rightarrow 81$$

$$1 \text{ unit} \rightarrow 81 \div 3 = 27$$

$$2 \text{ units} \rightarrow 2 \times 27 = 54$$

There were 54 white dogs at the doggie daycare.

Lastly, your child will learn how to use ratios to compare three quantities, finding equivalent ratios as well as the simplest form of the ratio.

Example: 2 : 6 : 18

Multiply each term by a number to find an equivalent ratio:

$$\begin{array}{r} 2 : 6 : 18 \\ \times 2 \downarrow \quad \times 2 \downarrow \quad \times 2 \downarrow \\ 4 : 12 : 36 \end{array}$$

Divide each term by a common factor to find an equivalent ratio in simpler terms:

$$\begin{array}{r} 4 : 12 : 36 \\ \div 2 \downarrow \quad \div 2 \downarrow \quad \div 2 \downarrow \\ 2 : 6 : 18 \end{array}$$

What can we do at home?

- Finding real world examples of ratios is a good way to practice at home. Some examples are the ratio of hours spent sleeping vs being awake, the ratio of adults to children in the home, and the ratio of cars of various colors on the road. There are so many possibilities!

Home Connection

In Chapter 14, your child will learn to compare quantities using rates, which are ratios where the terms have different units. Some examples include miles per hour, dollars per hour, and gallons per minute.

A unit rate is the amount of one quantity for each unit of another quantity. For example, a unit rate could be the cost for one pound of food or the pay for one hour of work. The term “per” is used instead of “for.” For example, a rate of 10 miles per hour means 10 miles every hour. The term “per” is generally used to mean “in each,” or “in one.”

Your child will learn how to use a line model to solve problems involving rates, which is a number line with two sets of units at each tick mark.

Example #1: A machine packs 60 cartons in 2 hours. How many cartons can it pack in 5 hours?

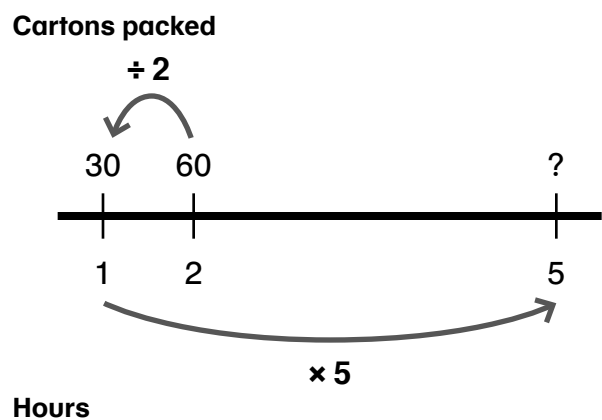
2 units (or hours) $\rightarrow$ 60 cartons

1 unit (or hour) $\rightarrow 60 \div 2 = 30$ cartons

The unit rate is 30 cartons per hour.

5 units (or hours) $\rightarrow 5 \times 30 = 150$ cartons

The line model is a visual representation of the relationship between the number of cartons and the number of hours.



Example #2: A factory stamps 4 cartons in 1 minute. How long will it take to stamp 80 cartons?

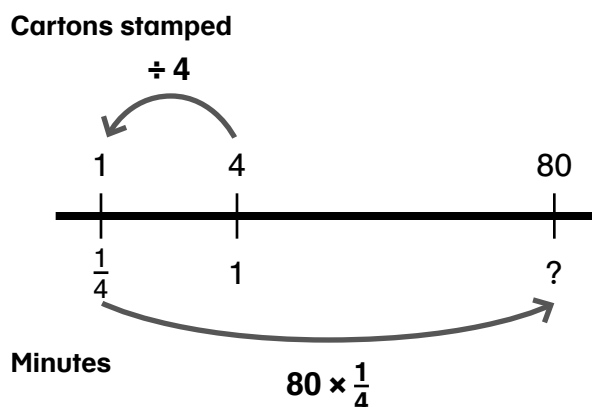
Method 1:

This line model shows the relationship between cartons and minutes.

4 cartons $\rightarrow$ 1 minute

1 carton $\rightarrow \frac{1}{4}$ minute

80 cartons $\rightarrow 80 \times \frac{1}{4} = 20$ minutes



Method 2:

Your child might prefer to think in terms of “grouping.” In this case, a “group of 4 cartons” is stamped in 1 minute. The question becomes, “How many groups of 4 cartons are there in 80 cartons?” Each group represents 1 minute.



$80 \div 4 = 20$ minutes

What can we do at home?

- When shopping, prices per pound or per unit are typically posted near items. This is a great opportunity to ask your child how much a different amount of a product would cost. For example, if a pound of apples is about \$2.00 per pound, how much would $\frac{1}{2}$ of a pound cost? How much would 3 pounds of apples cost? How much would $3\frac{1}{2}$ pounds cost?
- When driving to a destination, have your child calculate your arrival time based on how far you must travel and the speed at which you are driving. For example, you have 5 miles to go, and are traveling 50 miles per hour. How long will it take to arrive?

Home Connection

In this concluding chapter, your child will learn that a percentage is a way to express one quantity as a part of the base quantity of 100. They will also learn that the term percent comes from the Latin “per centum,” and means “out of 100.”

Your child spent a significant amount of time in Grade 5 learning about fractions with a denominator of 10 or 100. They also learned how to convert these fractions into decimals and vice versa. When it comes to percentages, your child will learn that the percentage is always the value of the numerator when the denominator is 100.

Example: 58 out of 100 fifth-grade students are in Band. What percentage of students are in Band?

58 out of 100 means $\frac{58}{100}$

$$\frac{58}{100} = 58\%$$

58% of the fifth-grade students are in Band.

Your child will learn how to calculate percentages from decimals, and since percentages are always a part of 100, this is often found to be a simple concept.

Example: Express 0.3 as a percentage.

$$0.3 = \frac{3}{10} = \frac{30}{100} = 30\%$$

Your child will then learn two methods for converting a fraction to a percentage. Your child will see a bar model and an associated percentage to help visualize the correlation.

3 out of 5 or $\frac{3}{5}$ of the students are boys.



Method 1

Find an equivalent fraction with a denominator of 100 and express it as a percentage.

$$\frac{3}{5} = \frac{60}{100} = 60\%$$

Diagram showing the conversion of $\frac{3}{5}$ to $\frac{60}{100}$ by multiplying both the numerator and denominator by 20.

Method 2

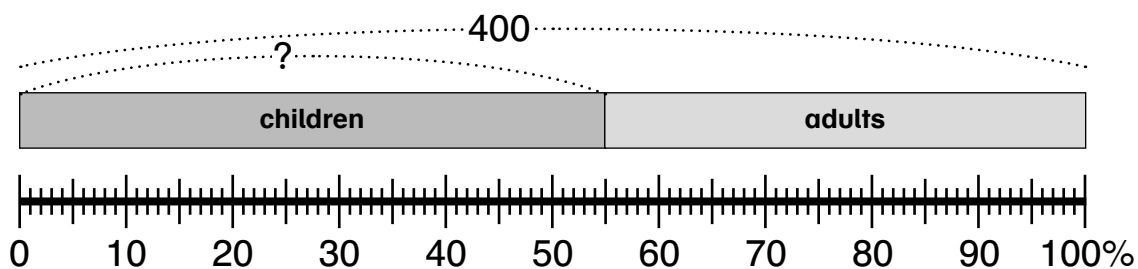
Convert the fraction to a percentage by multiplying the fraction by 100%.

$$\frac{3}{5} \times 100\% = 60\%$$

60% of the students are boys.

Your child will also learn two methods to find the percentage of a quantity.

There are 400 people at the carnival. 55% of them are children and the rest are adults. How many children are at the carnival?



Method 1

Convert the percentage to a fraction, and then multiply by the total.

$$55\% \rightarrow \frac{55}{100}$$

$$\frac{55}{100} \times 400 = 220$$

Method 2

Find the value of 1 unit (1%), and then solve for the number of units required.

$$100\% \longrightarrow 400$$

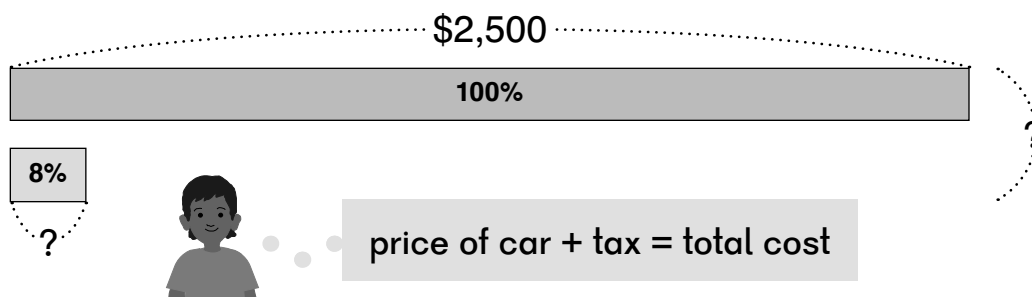
$$1\% \longrightarrow \frac{400}{100} = 4$$

$$55\% \longrightarrow 55 \times 4 = 220$$

There are 220 children at the carnival.

Finally, your child will learn how to calculate a percent increase. To do this, they will determine the quantity of the increase, and then add it to the original base number to get the new total.

Miss Harold wants to buy a used car that has a price of \$2,500. In addition to the price of the car, she has to pay a sales tax of 8%. What will be the total cost of the car?



Method 1

$$\frac{8}{100} \times 2,500 = 200$$

$$2,500 + 200 = 2,700$$

Method 2

$$100\% \longrightarrow 2,500$$

$$1\% \longrightarrow \frac{2,500}{100} = 25$$

$$8\% \longrightarrow 8 \times 25 = \$200$$

$$2,500 + 200 = 2,700$$

The total cost of the used car is \$2,700.

What can we do at home?

- Tipping a server for a service offers a great opportunity to practice calculating percentages in the real world. The next time your child is with you and a tip is appropriate for a service, ask your child to calculate it for you. Ask, “What is ____% of the total bill?”