

## CHAPTER 2

**Feature:** Diverse perspectives  
**Benefit:** Stories of the development of number concepts from various cultures as required by the curriculum

# RATIO, RATE AND PERCENTAGES

Canada is home to the world's largest Inuit population. Living largely in the north, Canada's Inuit population is over 65 000 people strong and have provided this some of the most interesting and unique cultural icons recognized around the world.

Most people have seen Inuit carvings. One of which is shown here. Beautiful soapstone carvings respected and admired around the world.



### Inuksuk

One icon that you still see in the inuksuk. An inuksuk is shown at the right. You may see them everywhere from British Columbia to Peggy's Cove.

Traditionally, they were used by the Inuit people in the north as directional markers. An Inuksuk in the shape of a person, like this one, signifies safety, hope and friendship.



### Your Turn

Look at the picture shown above of the inuksuk. Try and answer these questions. You may need to come back to this page after finishing the chapter.

- How many stones are there?
- What percentage of the stones are horizontal? Vertical?
- Write a ratio to compare the number of horizontal stones to the number of vertical stones.

### What Do You Think?

Look up another inuksuk.

- What does it represent?
- Write a paragraph that can relate a short story about the Inuksuk just researched.

**Did You Know?**  
The Canadian band Rush put an Inuksuk on the cover of their 1996 album *Test for Echo*.  
Inuit culture is alive and well in Canada despite many of the negative impacts of recent history.

## 2.1 Ratios

In a class, there are 12 students who like math best and 9 students who like science best. We can compare the number of students who like math to the number of students who like science and say, “The ratio of students who like math to students who like science is 12 to 9”.

The word “to” is used to compare two numbers and *12 to 9* is called a ratio. A **ratio** is a comparison of numbers that have the same units.

The ratio *12 to 9* can be written in three ways.

In words as shown.  
12 to 9

Using a colon.  
12 : 9

As a fraction.  
 $\frac{12}{9}$

Often, ratios are written either in fraction form or in colon form. These forms make it easier to work with and to communicate. This is especially true as ratios, like fractions, are written in simplest form.

To write the ratio above in simplest form, use your skills with fractions.

$$\begin{aligned}\frac{12}{9} &= \frac{12 \div 3}{9 \div 3} \\ &= \frac{4}{3}\end{aligned}$$

Once simplified, the ratio can be written in the 3 different forms.

$$4 \text{ to } 3 \quad \text{or} \quad 4 : 3 \quad \text{or} \quad \frac{4}{3}$$

The order in which the ratio is written is important.

- The ratio above can be interpreted to mean that “for every 4 students who like math in the class, there are 3 who like science.”
- If the ratio had been written as 3 : 4, this would mean that for every 3 students who like math in the class there are 4 students who like. *For the class above, this is not true.*

When communicating a ratio:

- write the ratio in the order written
- simplify the ratio
- use only numbers in the final ratio (no units are written)

**Feature:** Multiple Step-by-step solved examples.  
**Benefit:** Supports students inside and outside of the classroom and models the types of questions students are expected to complete.

## Examples with Solutions

Samir was painting his room. He spent \$45 on wall paint, \$25 on ceiling paint, and \$9 for brushes. Write a ratio to compare each of the following.

- a) cost of wall paint *to* cost of ceiling paint

Always try to write in fraction form to help simplify the ratio *and without units*.

$$\begin{aligned}\frac{45}{25} &= \frac{45 \div 5}{25 \div 5} \\ &= \frac{9}{5}\end{aligned}$$

Write the ratio in each of the 3 forms.

Words: 9 *to* 5

Colon: 9 : 5

Fraction:  $\frac{9}{5}$

- b) cost of ceiling paint *to* cost of wall paint

$$\begin{aligned}\frac{25}{45} &= \frac{25 \div 5}{45 \div 5} \\ &= \frac{5}{9}\end{aligned}$$

Notice how the ratio is the opposite of the one in a).

Words: 5 *to* 9

Colon: 5 : 9

Fraction:  $\frac{5}{9}$

- c) cost of ceiling paint *to* cost of brushes

$$\begin{aligned}\frac{45}{9} &= \frac{45 \div 9}{9 \div 9} \\ &= \frac{6}{1}\end{aligned}$$

Words: 6 *to* 1

Colon: 6 : 1

Fraction:  $\frac{6}{1}$

In part c), the denominator of 1 stayed when writing the fraction form.

The 1 is needed when interpreting the ratio of “cost of ceiling paint *to* cost of brushes as 6 to 1.” There are two costs being compared and two numbers are needed when writing the ratio. Without the denominator of 1, the ratio has no meaning.

**Feature:** Social Emotional Learning

**Benefit:** Approaches to instruction that support all students as they work to apply mathematical thinking, make connections and develop healthy identities as math learners to foster well-being and the ability to learn math.

### Mindfulness Moment

When you are feeling anxious or stressed, stop. Breathe in for 3 seconds, hold it for 3 seconds, then breathe out for 3 seconds.

Repeat 3 to 5 times. It will help to calm you.

**Feature:** Clear, Concise and Straightforward

**Benefit:** Easy to read, easy to use. Supports the diverse and wide-ranging needs of all de-streamed students by ensuring that the reading level and the math are accessible to students of all ability levels with multiple entry points based on ability.

## 2.1 Exercises

Write each comparison as a ratio in simplest form.

	Description	Words	Colon	Fraction
1.	10 dogs <i>to</i> 20 cats			
2.	75 dollars <i>to</i> 35 dollars			
3.	22 sour keys <i>to</i> 55 jujubes			
4.	25 apples <i>to</i> 25 blue oranges			

Last month, a family spent \$1200 on rent and \$250 on food. Write a ratio, in three different forms, to compare each.

5. the amount spent on rent *to* the amount spent on food

6. the amount spent on food *to* the amount spent on rent

7. Describe how your work in #5 may have helped simplify your work in #6.

**Feature:** Lots of space for the student to work!

There are 8 cooks, 14 servers, and 2 managers working in a busy restaurant. Write a ratio in 3 different forms to compare each.

8. the number of servers *to* the number of managers

9. the number of managers *to* the number of cooks

10. the number of managers *to* the total number of people working

11. the number of cooks *and* servers *to* the number of managers

**Feature:** Lots of space for the student to work!

In January 2022, the minimum wage in Ontario was \$15 per hour. The minimum wage in Prince Edward Island was \$13 per hour.

12. What is the difference between the minimum wages?

13. Write a ratio to compare the minimum wage in Ontario *to* the minimum wage in Prince Edward Island.

14. Write a ratio to compare the difference in minimum wages *to* the minimum wage in Ontario.

**Feature:** Lots of space for the student to work!

15. Did you need to simplify your ratios in #13 or #14? Why?

**Feature:** Exciting Extras

**Benefits:** provides interesting and relevant applications that will show where the math is useful and provide challenges for your more capable students.

## Exciting Extras



When working with integers, we saw that

- a gain of \$3 can be written as +3
- a gain of -\$6 can be thought of as a loss of \$6 and can be written as -6

How might we compare a gain of \$3 to a gain of -\$6?

$$\frac{3}{-6} = \frac{3 \div 3}{-6 \div 3}$$
$$= \frac{1}{-2}$$

You can combine your work with ratios with your work with integers to write the ratio.

The ratio can be written as

$$1 \text{ to } -2 \quad 1 : -2 \quad \frac{1}{-2}$$

The negative sign stays with the denominator to represent a *loss* of \$6. Don't let the negative sign move around the ratio as this will change its meaning.

Write each comparison as a ratio in simplest form.

	Description	Words	Colon	Fraction
16.	a gain of \$10 to a gain of \$30			
17.	a loss of 45 dollars to a gain of 35 dollars			
18.	a gain of \$45 to a loss of \$15			
19.	A loss of \$37 to a loss of \$37			

## 2.2 Rates

In the previous lesson, we compared quantities that had the same units. We can also compare quantities that have different units. Some rates will likely be familiar.

- We might run 30 km in 5 hours
- We might spend \$90 for 15 kg of vegetables

You can use your skills with ratio to write these comparisons.

Write 300 km in 5 hours as a ratio in simplest form.

$$\begin{aligned}\frac{300 \text{ km}}{5 \text{ hours}} &= \frac{300 \text{ km} \div 5}{5 \text{ hours} \div 5} \\ &= \frac{60 \text{ km}}{1 \text{ hour}}\end{aligned}$$

Write \$90 for 15 kg as a ratio in simplest form.

$$\begin{aligned}\frac{\$90}{15 \text{ kg}} &= \frac{\$90 \div 15}{15 \text{ kg} \div 15} \\ &= \frac{\$6}{1 \text{ kg}}\end{aligned}$$

The skills we discovered with ratios are used to simplify the above comparisons. The comparisons are not in the same units so the units stay with the calculations.

Each example above, when simplified, can be read and interpreted.

- driving 300 km in 5 hours *means* driving 60 km in 1 hour
- spending \$90 for 15 kg of vegetables *means* spending \$6 for 1 kg of vegetables

When we find how far we can drive in one hour, or how much something costs for one kilogram, we are finding a **unit rate**. A unit rate is a simplified ratio with 1 as *the denominator*.

When communicating with unit rates, we use the word “per”.

- 60 km in 1 hour can be read as “60 km *per* hour” and written as 60 km/h
- \$6 for 1 kg of vegetables can be read as “\$6 *per* kilogram of vegetables” and is written as \$6/kg.



**Feature:** Self-contained resource with instruction, examples and exercises all in the same book.

**Benefit:** helps students stay organized and not lose their work.

## Examples with Solutions

Any comparison can be written as a unit rate. We need to simplify the ratio so that the denominator is 1.

Write each of the following as a unit rate.

- a) Brad earned \$173.25 in 9 h of work. How much did he earn *per* hour?

$$\begin{aligned}\frac{\$173.25}{9 \text{ hours}} &= \frac{\$173.25 \div 9}{9 \text{ hours} \div 9} \\ &= \frac{\$19.25}{1 \text{ hour}}\end{aligned}$$

Brad earned \$19.25 per hour or \$19.25/h.

To write a comparison as a unit rate:

- write the ratio in fraction form
- divide numerator and denominator by the number in the denominator

- b) Sarita walked 8.75 km in 2.5 h. Write a unit rate to show how far she walked each hour?

$$\begin{aligned}\frac{8.75 \text{ km}}{2.5 \text{ hours}} &= \frac{8.75 \text{ km} \div 2.5}{2.5 \text{ hours} \div 2.5} \\ &= \frac{3.5 \text{ km}}{1 \text{ hour}}\end{aligned}$$

Sarita walked 3.5 km in 1 h or 3.5 km/h

## Exercises 2.2

Write each expression as a unit rate.

1. 15 toys were made in 3 h

2. 250 km were driven in 5 h

3. \$120 was earned in 5 h

4. Darlene typed a 5-page essay in 2 h. Write a unit rate to show how many pages she typed in one hour.

**Feature:** Lots of practice questions gradually increasing in difficulty from simple practice questions to challenging problems.

**Benefit:** Lots of practice to reinforce concepts, and challenge students of all ability levels in a de-streamed classroom by offering multiple entry points for students. You never have to look for questions again.



5. Sasha spent 21 h doing homework last month. She has 4 courses and spends the same amount of time on each course. Write a unit rate to show how much time she spent doing homework in each course.

As a science experiment, Jasmine recorded the number of times her eyes blinked. She found she blinked 84 times in 7 minutes. Write a unit rate to

6. show blinks per minute.                              7. blinks per second.

Frank works in Saskatchewan and earns minimum wage. Last week, he worked for 32 h and earned \$377.92.

8. Write a unit rate to show how much Frank earns each hour.
9. What is minimum wage in Saskatchewan?
10. Giovanni drove 270 km to go fishing. It took him 3.75 h. How far did he drive each hour?
11. Anna-Maria grew vegetables to sell at her stand. Yesterday, she sold 73 kilograms of broccoli for \$330.69. What is her selling price per kilogram for broccoli?

## 2.3 Comparison Shopping: The Better Buy

Two websites are offering sales on the same product as shown below. Which store has the better buy?

### Website A

5 music downloads for \$7.50

### Website B

8 music downloads \$11.50

The work with unit rates can help us make the decision as to which is the better buy. To do so, find the cost of 1 music download at each website.

### Website A

$$\begin{aligned} \frac{\$7.50}{5 \text{ downloads}} &= \frac{\$7.50 \div 5}{5 \text{ downloads} \div 5} \\ &= \frac{\$1.50}{1 \text{ download}} \end{aligned}$$

Website A sells music downloads for \$1.50/download.

### Website B

$$\begin{aligned} \frac{11.50}{8 \text{ downloads}} &= \frac{\$11.50 \div 8}{8 \text{ downloads} \div 8} \\ &= \frac{\$1.44}{1 \text{ download}} \end{aligned}$$

Website B sells music downloads for \$1.44/download.

By finding the unit rate, we can see that Website B has the better buy because the price for 1 music download is less expensive in Website B.

## 2.3 Exercises

Find the unit rate for each store. Then decide which offers the better buy.

### Store A

1. 5 bottles of juice for \$10

2. 6 cans of soup for \$3.60

3. 20 batteries for \$14

### Store B

9 bottles of juice for \$21

4 cans of soup for \$2.75

15 batteries for \$9.50

Decide which is the better buy between these two stores.

**Store A**

**Store B**

- |    |                                   |                                  |
|----|-----------------------------------|----------------------------------|
| 4. | 20.5 g of deli cheese for \$12.49 | 13.5 g of deli cheese for \$8.64 |
| 5. | 12.5 kg of vegetables for \$22.50 | 5.5 kg of vegetables for \$8.80  |
| 6. | 4.5 kg of soap for \$7.88         | 7.5 kg of soap for \$11.82       |
| 7. | 2.4 lb bag of rice for \$8.88     | 4 kg bag of rice for \$14.27     |

8. Phillippe drove a car and used 75 L of gas to drive 675 km. Jean drove a car and used 90 L of gas to drive 765 km. Which driver had the better gas mileage?



**Feature:** Updated names and relevant examples throughout the book.

9. A music group performed in Timmins. They sold 575 tickets and the total cost of tickets was \$4887.50. The same group performed in Niagara Falls. There they sold 950 tickets and the total cost of tickets was \$7837.50. You have a choice of seeing them in Niagara Falls or Timmins. Where would you go to watch? Give reasons for your choice.

**Feature:** Easy-to-use and Integrated & Online Coding Applications

**Benefit:** Offers Teachers with minimal coding experience the opportunity to give students a fun learning experience online while simultaneously supporting the new coding expectations and enhancing student's mathematical understanding.

## 2.4 Coding Applications

**Coding** is writing out instructions that a computer can understand to produce a desired result. The result the computer produces is called the **output**.

When writing computer code, consider the following.

- Instructions need to be exact. A computer will only do exactly what it is told to do and in the exact order the code is written.
- Provide instructions for all the possible situations.
- Write the least amount of code to produce the output. By doing this, we create an efficient program.

We can use loops and conditional statements to make the code more efficient. A

**loop** tells the computer to repeat part of the code a certain number of times.

**Conditional statements** tell the computer which part of the code to execute based on whether certain conditions are true or false.

Sometimes we need to use **variables**. We can set a variable to a certain value when we are trying to calculate something. **Input** is the information that we are giving to the computer.

### Get Into the Coding Mindset

Suppose you are working on a project with a partner. You need a recycling bin that your teacher keeps on the other side of the classroom. You ask your partner to get the bin while you work at your desk.

Your instructions to your partner might look something like this.

*“Please get the recycling bin from the other side of the classroom.”*

Your partner would be able to follow these instructions because they would make the assumptions and decisions needed to complete the task (bringing the recycling bin back to your desk).

A computer would need more detailed information.

- The computer would need the direction that it would need to move.
- The computer would need the distance it would need to move.
- The computer would need to know what to do if it hit an obstacle like a desk.
- What else do you think a computer might need to be “told”?

Computers can help solve math problems like those in this chapter.

We can compare two numbers. Which number is bigger: 17 or 23? We know that  $23 > 17$ , but a computer needs specific instructions to compare the numbers.

Here is what the code might look like.

Code	Explanation
set <i>number 1</i> = 17	Set the first variable <i>number 1</i> = 17
set <i>number 2</i> = 23	Set the second variable <i>number 2</i> = 23
if <i>number 1</i> > <i>number 2</i> say, “ <i>Number 1</i> is bigger than <i>number 2</i> .”	Compare the numbers Our output statement if <i>number 1</i> is bigger
else say, “ <i>Number 2</i> is bigger than <i>number 1</i> .”	Our output statement if <i>number 2</i> is bigger

## Examples with Solutions

Write code required to solve each of the following problems.

1. Determine which number is bigger from **any** two different numbers given.

We don't know what the two numbers are, so we need to first ask for the numbers, and then we can set our variables (**number 1** and **number 2**) equal to those answers (the inputs).

ask “what's the first number?”

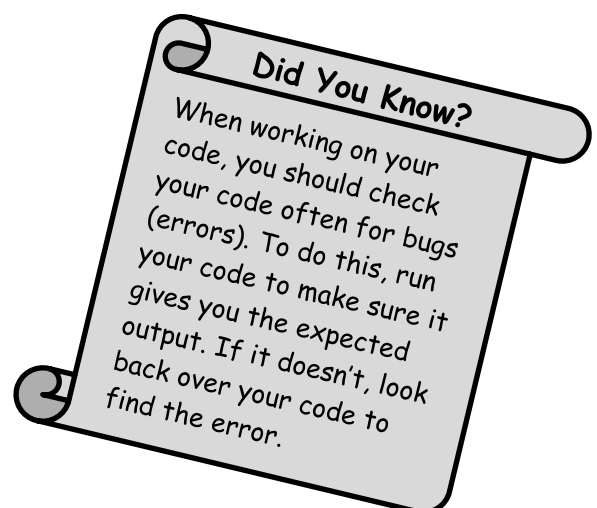
set *number 1* = *answer*

ask “what's the second number?”

set *number 2* = *answer*

if *number 1* > *number 2* say “*number 1* is bigger than *number 2*”

else say “*number 2* is bigger than *number 1*”



2. Calculate the average number of points scored at volleyball games for the season.

First ask how many games were played this season. We use this value to determine how many times our loop will repeat.

→ ask “how many volleyball games were played this season?”  
set **total games** = *answer*

We need to set the **total score** to zero so that we have a starting value.

→ set **total score** = 0

Inside our loop, we add each new score to the current total.

→ repeat for **total games**  
ask “what was the score?”  
set **total score** = **total score** + *answer*  
move to the next game

After the loop has repeated for each game, we calculate the average score and output the result.

→ set **average** = **total score** / **total games**  
say “the average score was **average**”

3. Determine the unit cost if you purchase 12 chocolate bars for \$18.60.

We first create a variable named **total cost** that we set to the total for all 12 chocolate bars.

→ set **total cost** = 18.6

We then create another variable named **total units** which we set to the number of units we’re getting.

→ set **total units** = 12

Another variable called **unit cost** is created and set to the value of **total cost** divided by **total units**.

→ set **unit cost** = **total cost** / **total units**

We output the result.

→ say “the unit cost is **unit cost**”

## Exercises 2.4

1. Write a code to determine if any two numbers are equal.

2. Write a code to determine which number is bigger when **any two numbers** are given. Hint: Don't forget to include code that can handle situations where the two numbers are the same.
  
  
  
  
  
  
  
  
  
  
3. You play a game with three of your friends. You all add up your scores for the round. Write a code that could be used to calculate the average score of you and your friends.

Write a code to determine which is the better buy and then execute your code (do the calculations) to solve each problem.

4. 3 oranges for \$1.69 or a box of 12 oranges for \$6.99.
5. 150 g of gummy bears for \$2.79 or 1 kg of gummy bears for \$19.99.
  
  
  
  
  
  
  
  
  
  
6. A car is travelling at a constant speed and covers a distance of 146 km in 2.5 hours. Write a code to find the average speed the car is travelling (in km/h).

## 2.5 Proportions

When we simplify a ratio, we are creating a proportion.

$$\frac{16}{28} = \frac{4}{7} \text{ because } \frac{16 \div 4}{28 \div 4} = \frac{4}{7}$$

$$\frac{12}{8} = \frac{3}{2} \text{ because } \frac{12 \div 4}{8 \div 4} = \frac{3}{2}$$

Two ratios that are equal is a **proportion**. Proportions can be created by multiplying and not just simplifying.

$$\frac{5}{9} = \frac{25}{45} \text{ because } \frac{5 \times 5}{9 \times 5} = \frac{25}{45}$$

$$\frac{12}{8} = \frac{36}{24} \text{ because } \frac{12 \times 3}{8 \times 3} = \frac{36}{24}$$

A proportion is said to be “true” if the two ratios are equal. In any true ratio, the *cross products* are equal. Look at the proportions above.

$$\frac{16}{28} = \frac{4}{7}$$

Follow the arrows and multiply the numbers.

$$16 \times 7 = 102$$

$$28 \times 4 = 102$$

Since each product is equal, the proportion is “true”.

Try this with other proportions. What do you notice?

This information can help us find the missing value in a proportion. In the proportion below, a value is missing. Let’s connect what we know about proportions above with what we know about solving an equation to find the missing value.

$$\frac{3}{7} = \frac{n}{28}$$

$$7 \times n = 28 \times 3$$

$$7 \times n = 84$$

$$\frac{7 \times n}{7} = \frac{84}{7}$$

$$n = 12$$

We want to find the value of  $n$ . Follow these steps.

1. Find the *cross product*.
2. Multiply the numbers (on the right).
3. Divide both sides by the number multiplying by  $n$ . In this case, 7.

The missing number can be anywhere in the proportion, but we can find it by using these same steps.



## Examples with Solutions

Find the missing value in each of the following.

a)

$$\begin{aligned}\frac{n}{10} &= \frac{15}{20} \\ 20 \times n &= 10 \times 15 \\ 20 \times n &= 150 \\ \frac{20 \times n}{20} &= \frac{150}{20} \\ n &= 7.5\end{aligned}$$

b)

$$\begin{aligned}\frac{12}{n} &= \frac{3}{6} \\ 3 \times n &= 6 \times 12 \\ 3 \times n &= 72 \\ \frac{3 \times n}{3} &= \frac{72}{3} \\ n &= 24\end{aligned}$$

c)

$$\begin{aligned}\frac{15.8}{4.5} &= \frac{8.5}{n} \\ 15.8 \times n &= 8.5 \times 4.5 \\ 15.8 \times n &= 38.25 \\ \frac{15.8 \times n}{15.8} &= \frac{38.25}{15.8} \\ n &= 2.42\end{aligned}$$

## Exercises 2.5

Write whether each proportion is “true” or “false.” How do you know?

1.

$$\frac{45}{20} = \frac{9}{4}$$

2.

$$\frac{13}{36} = \frac{3}{9}$$

3.

$$\frac{2}{6} = \frac{17}{51}$$

Simplify the ratio on the left in each of the following proportions. Use the simplified ratio to find the missing value in the ratio at the right.

4.

$$\frac{12}{20} = \frac{3}{n}$$

5.

$$\frac{11}{33} = \frac{n}{3}$$

6.

$$\frac{27}{63} = \frac{3}{n}$$

Simplify the ratio on the right in each of the following proportions. Use the simplified ratio to find the missing value in the ratio at the left.

7.

$$\frac{n}{20} = \frac{3}{60}$$

8.

$$\frac{8}{n} = \frac{24}{3}$$

9.

$$\frac{5}{22} = \frac{n}{88}$$

Find the value of  $n$  in each proportion.

10.

$$\frac{27}{45} = \frac{3}{n}$$

11.

$$\frac{55}{33} = \frac{n}{3}$$

12.

$$\frac{63}{n} = \frac{9}{7}$$

13.

$$\frac{n}{8} = \frac{3}{48}$$

14.

$$\frac{n}{15} = \frac{10}{3}$$

15.

$$\frac{3}{63} = \frac{21}{n}$$

Solve each proportion. Where needed, round to two decimal places.

16.

$$\frac{3.3}{2.1} = \frac{4.5}{n}$$

17.

$$\frac{5.5}{6.3} = \frac{n}{0.3}$$

18.

$$\frac{5.1}{n} = \frac{0.9}{8.7}$$

19.

$$\frac{n}{2.8} = \frac{1.7}{8.5}$$

20.

$$\frac{n}{3.6} = \frac{4.1}{0.3}$$

21.

$$\frac{2.3}{5.7} = \frac{3.2}{n}$$

## Exciting Extras

In Ontario, whenever an item is bought, there is usually a Harmonized Sales Tax of 13% added to the cost. It is a good idea to know what this added cost will be before taking an item to the cash register.

Suppose Marlena bought a sweater for \$39.99.

- How much HST must she pay?
- How much does she pay in total for the sweater?

To calculate the HST, use the same proportion.

percent = 13 (HST rate in Ontario)

base = 39.99 (cost of item)

amount =  $n$  (amount of HST added)

$$\frac{\text{percent}}{100} = \frac{\text{amount}}{\text{base}}$$

$$\frac{13}{100} = \frac{n}{39.99}$$

$$100 \times n = 39.99 \times 13$$

$$100 \times n = 519.87$$

$$\frac{100 \times n}{100} = \frac{519.87}{100}$$

$$n = 5.1987$$

**Feature:** Written for Ontario students by Canadian teachers with expertise in de-streamed math classrooms and reviewed by Ontario teachers.

**Benefit:** Resource created for successful implementation of Ontario's new de-streamed curriculum and with de-streamed students and classrooms in mind. Ensuring no teacher or student is left behind.

The HST added is \$5.20.

The total cost is \$39.99 + \$5.19 or \$45.18.

Jessica bought a pair of shoes for \$129.49.

8. How much HST will she pay?

9. What is the total cost of the shoes?

Deandre bought a coat of shoes for \$179.99.

10. How much HST will he pay?

11. What is the total cost of the coat?

**Feature:** Chapter Reviews and Practice Test  
**Benefit:** To check student understanding and provide review before a formal assessment.

## Chapter Review



### Ratios

Write each comparison as a ratio in simplest form.

	Description	Words	Colon	Fraction
1.	\$15 to \$50			
2.	75 marbles to 35 marbles			
3.	57 cards to 19 cards			
4.	15 keys to 15 keys			

### Rates

Write each expression as a unit rate.

5. \$75 was made in 3 h

6. 555 km was driven in 5 h

7. Chelsea cut 35 pieces of drywall in 7 h. Write a unit rate to show how many pieces of drywall can be cut in one hour.

8. Which the better buy?

- 7 bottles of an energy drink for \$17.50
- 12 bottles of the same energy drink for \$28.80?

Proportions

Solve each proportion. Where needed, round to two decimal places.

9.

$$\frac{3}{2} = \frac{45}{n}$$

10.

$$\frac{2.5}{3.6} = \frac{n}{2.3}$$

11.

$$\frac{n}{4.6} = \frac{2.9}{1.7}$$

12. A car can drive 275 km on 15 L of fuel. At this rate, how many litres of fuel are needed to drive 350 km?

13. A deli counter bought 12 kg of cheese for \$79.95. At this rate, how much would they pay for 20 kg of the same cheese?

Percents

14. 35% of what number is 75?

15. What percent of 90 is 55?

A tent was purchased for \$299.95.

16. How much HST is charged?

17. What is the total cost of the tent?

**Feature:** Chapter Reviews and Practice Test  
**Benefit:** To check student understanding and provide review before a formal assessment.

## Chapter Test



1. 27% of 35 is what number?
2. What percent of 15 is 12?

A family spent \$250 on food, \$80 on internet, and \$55 for a phone. Write a ratio for each of the following.

3. the amount spent on food to the cost of the phone
4. cost of internet to cost of phone
5. total amount spent to cost of internet
6. Which is the better buy?
  - 100 g of toothpaste for \$4.49
  - 250 g of toothpaste for \$11.49
7. A pole is 12.5 m tall. It casts a shadow that is 4.75 m long. A second pole next to it casts a shadow that 2.5 m long. How tall is the second pole?

8. Harena receives a commission of 10.5% for selling shoes. If she earned \$96.75 in commission for one day, what was the total value of the shoes she sold?
9. Omar drove a van from Niagara Falls to Hamilton. The total distance was 78 km and he used 4.2 L of fuel. The next week, he drove from Niagara Falls to Toronto which is a total of 118 km. How much fuel did he use?
10. Last week, Harmen worked 32 h and earned \$952. How much does he earn in one hour?
11. A recipe for chocolate chip cookies calls for it to have 44% of its mass as chocolate chips. A bag of cookies has a mass of 540 g. What is the mass of chocolate chips?



**Feature:** Full answer key provided.

**Benefit:** Students can check their work and revise answers to questions and solutions to problems as needed, resulting in enhanced learning and retention.