

- A three-term ratio compares three quantities measured in the same units.

The ratio of red to black to blue tiles can be written as 6:3:3 or 6 to 3 to 3. The ratio in lowest terms is 2:1:1 or 2 to 1 to 1.



- A two-term ratio compares two quantities measured in the same units.

The ratio of black to total tiles can be written as 3:12 or 3 to 12. The ratio in lowest terms is 1:4 or 1 to 4. One out of every four tiles is black.

Communicate the Ideas

1. Janine wants to write the ratio of oranges to apples. How does she know whether to write 3:4 or 4:3?
2. Your friend missed the class when ratios were introduced. Use an example and draw a diagram to explain the difference between a part-to-part ratio and a part-to-whole ratio.
3. Give two examples of how ratios are used in daily life. Share your ideas with a classmate.
4. The fraction $\frac{2}{5}$ can be interpreted as two parts out of a total of five parts. Use a diagram to show an example of this part-to-whole ratio.



Check Your Understanding

Practise

For help with #5 to #8, refer to Example 1 on pages 47–48.

5. Write each ratio using ratio notation. Do not write the answers in lowest terms.
 - a) \$2 compared to \$8.
 - b) The width of the cover of this book compared to its length, in centimetres.
 - c) In a class, 14 of 30 students are girls. What is the ratio of boys to girls to total students?
 - d) Your age compared to that of a 28-year-old person.
6. Write each ratio in #5 as an equivalent ratio in lowest terms.
7. Write each ratio in fraction form. Do not write the answers in lowest terms.
 - a) You spend \$4 out of \$10.
 - b) A team won three games and lost six games. What is the ratio of games won to games played?
 - c) A bag contains 12 red and 3 blue beads. Compare blue beads to total beads.
 - d) A pond contains 27 guppies and 33 goldfish. What is the ratio of guppies to total fish?

8. Identify the missing number to make an equivalent fraction.

a) $\frac{1}{2} = \frac{\blacksquare}{8}$

d) $\frac{3}{7} = \frac{\blacksquare}{21}$

e) $\frac{21}{49} = \frac{3}{\blacksquare}$

b) $\frac{4}{5} = \frac{12}{\blacksquare}$

d) $\frac{\blacksquare}{4} = \frac{3}{12}$

f) $\frac{4}{\blacksquare} = \frac{12}{15}$

For help with #9 to #11, refer to Example 2 on pages 49–50.

9. Use the data about wins and losses on school teams to answer the questions.

Sport	Wins	Losses
Hockey	9	6
Volleyball	10	5
Baseball	12	8

- a) Which sports have equivalent win-loss ratios? Show how you know.
- b) What is the ratio of wins to total games played for hockey? Give your answer as a fraction, a decimal, and a percent.
10. Tyler counted 20 cars in the school parking lot. Of these, 6 were red, 4 were green, and 1 was yellow.
- a) Draw a diagram to represent the situation.
- b) How many cars were not red, green, or yellow?
- c) What is the ratio of yellow to green to red cars?
- d) What is the ratio of red to total cars? Express the ratio as a fraction and a percent.

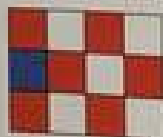
11. What tiles could be represented by each of the following ratios?

a) 1 to 5

b) 1:6:5

c) $\frac{1}{2}$

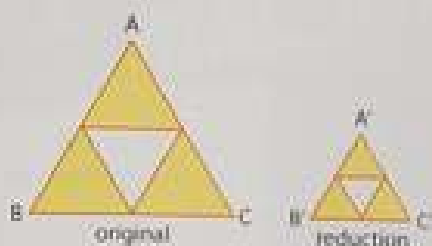
d) $\frac{11}{12}$



Apply

12. In a class of 32 students, there are 24 girls.
- a) What is the boys to total students ratio? Express the ratio as a fraction and a percent.
- b) What is the girls to boys ratio? Use ratio notation to express the ratio.
13. A soccer team played 28 games and won 4 out of every 7 games. There were no tied games.
- a) How many games did they lose?
- b) What was the team's win-loss ratio? Explain how you got your answer.
- c) If this trend continues, how many losses would you expect the team to have once they have won 20 games?
14. Three eighths of the 96 adults in the McGregor clan are less than 150 cm tall.
- a) Draw a diagram to represent the statement.
- b) How many adults in the McGregor clan are less than 150 cm tall? Show your work using equivalent ratios.
- c) How many adults are 150 cm or taller? Explain your thinking.
15. Diana and John are making three-cheese lasagna. The recipe calls for 100 g of Romano, 300 g of mozzarella, and 250 g of cottage cheese.
- a) Write a ratio in lowest terms to compare the amounts of the three cheeses. State the order of the cheeses.
- b) What amounts of Romano and cottage cheese do you need to make lasagna that contains 900 g of mozzarella cheese? Hint: Use equivalent ratios to help you.

16. Heather used a copier to make the following 50% reduction.



- Write the ratio of the length of $A'B'$ compared to the length of AB .
- Write the ratio of the length of $A'C'$ compared to the length of AC .
- Use your knowledge of ratio and percent to explain the meaning of a 50% reduction.

Literacy Link

A' is read as "A prime." A' labels the point in the reduction that corresponds to point A .

17. There are 48 passengers on a transit bus. At the next stop, 16 passengers got off and 12 others got on the bus.

- What is the ratio of the passengers who got off the bus compared to the original number on the bus? Show the ratio in lowest terms.
- What is the ratio of the passengers who got on the bus at the stop compared to the new total then on the bus? Write your answer as a fraction, a decimal, and a percent.

18. The ratio of the width to the length of the Canadian flag is 1:2.



- The flag on the cover of an atlas is 12 cm wide. How long is it?
- A large flag outside a Calgary school is 3 m long. What is its width?

WWW Web Link

To practise solving ratio problems, go to www.mathlinks.ca and follow the links.

19. The table gives the lengths of some rivers in Western Canada.

River	Length (km)
Churchill	1608
Fraser	1368
Mackenzie	1800
North Saskatchewan	1392
Thelon	904

- Write a ratio in fractional form to compare the length of the Churchill River and the Mackenzie River. Express the ratio as a fraction in lowest terms.
- Write a ratio in decimal form to compare the length of the North Saskatchewan River and the Fraser River. Express the ratio as a decimal correct to the nearest hundredth.
- The calculator keying sequence that compares the length of the Thelon River and the Churchill River is $\boxed{904} \div \boxed{1608} = \boxed{0.5621890547}$. Write the decimal to the nearest hundredth. What comparison statement can you make about the length of the two rivers?

20. A 30-kg bag of fertilizer is labelled 15-20-10. This means that it contains 15% nitrogen, 20% phosphorus, and 10% potassium by weight. How many kilograms of nitrogen, phosphorus, and potassium are in the bag?

Did You Know?

Fertilizer ratios indicate the percent of nitrogen, phosphorus, and potassium. This bag of fertilizer contains 15% nitrogen, 20% phosphorus, and 10% potassium by weight. The remaining 55% is made up of other micronutrients and filler.

