## Communicate the Ideas

1. Explain the similarities and differences between a ratio, a rate, and a proportion. Give an example of each one.

2. Your friend missed the lesson on proportions. Explain how to use a proportion to solve this problem.
Cheryl is selling marbles. What is the cost of seven marbles?

| Marbles | 2 | 3 | 4 |
|---|---|---|---|
| Cost (¢) | 70 | 105 | 140 |

3. a) Write a proportion based on the following scenario:
Three balls cost $1.25. What is the cost of 12 balls?
b) Solve the proportion.

# Check Your Understanding

## Practise

4. Determine the unit rate.
a) Three dinner rolls cost 99¢.
b) Seven identical objects have a mass of 14 kg.

5. What is the unit rate in each?
a) Two pens cost 94¢.
b) Four blocks stacked one on top of the other are 24 cm high.

6. Delia was paid $35 for 5 h of babysitting. How much should she receive for 3 h? Use a unit rate to find the answer.

7. Solve #6 using a proportion. Show how to find the answer more than one way.

8. Determine the missing value.
a) $\frac{2}{3} = \frac{\blacksquare}{15}$
b) $\frac{\blacksquare}{5} = \frac{14}{35}$
c) $\frac{30}{45} = \frac{6}{\blacksquare}$
d) $\frac{3}{\blacksquare} = \frac{12}{36}$

9. Determine the missing value to make each rate equivalent. Include the units.
a) $\frac{60\text{ km}}{3\text{ h}} = \frac{\blacksquare}{6\text{ h}}$
b) $\frac{\$3}{4\text{ cans}} = \frac{\$15}{\blacksquare}$
c) $\frac{178\text{ beats}}{2\text{ min}} = \frac{\blacksquare}{1\text{ min}}$
d) $\frac{48\text{ km}}{\$16} = \frac{192\text{ km}}{\blacksquare}$

10. Set up a proportion for each situation.
a) If 10 beans have a mass of 17 g, then 30 beans have a mass of 51 g.
b) There are 13 boys for 15 girls in every classroom at Albany Middle School. If there are 65 boys in the school, then there are 75 girls.
c) On a map, 1 cm represents 25 km. Kendra wants to ride her bike 160 km. This distance is 6.4 cm on the map.

11. A small gear turns 18 times in the same time that a large gear turns 4 times. How many times will the large gear turn if the small gear turns 54 times? Draw a diagram to help set up a proportion and solve the problem.

**12.** Set up a proportion for each situation using a variable. Do not find the answer.

**a)** Walter makes his own oil and vinegar dressing. His recipe calls for 175 mL of olive oil and 50 mL of vinegar. What amount of vinegar does he need to mix with 300 mL of olive oil?

**b)** A baseball player has a home run to strikeouts ratio of 3:17. How many home runs should he hit if he strikes out 187 times?

**13.** Two quarters have the same value as ten nickels. What is the value of five quarters in nickels?

**14.** Last night 30 cm of snow fell in 6 h. If it continues snowing at the same rate, how long will it take for 45 cm of snow to fall? Determine the answer two different ways.

## Apply

**15.** Look at the pattern. Set up a proportion you could use to find the number of small squares in Figure 7.

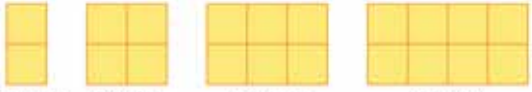


Figure 1 Figure 2 Figure 3 Figure 4

**16.** A gardener takes a half hour to mow and weed a lawn that measures 20 m by 15 m. He charges $25 per hour. How much should the gardener receive for a lawn that measures 40 m by 30 m?

**17.** Fresh pickerel is advertised in a local market.


1 kg = 1000 g

**a)** How much will 6 kg of pickerel cost?

**b)** Use a proportion to find the cost of 1600 g of pickerel.

**18.** At an amusement park, a new thrill ride was introduced. It costs $7.50 for 3 rides on the Wild Slider.

**a)** What is the Wild Slider's unit rate per ride?

**b)** At this rate, what would it cost for 18 rides on Wild Slider? Determine the answer two different ways.

**19.** Determine the missing value in each equivalent fraction.

**a)** $\frac{3}{\blacksquare} = \frac{18}{24} = \frac{\blacksquare}{12}$

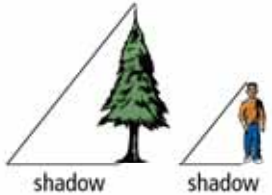
**b)** $\frac{48 \text{ km}}{\$16} = \frac{144 \text{ km}}{\blacksquare} = \frac{\blacksquare}{\$64}$

**20.** A breakfast cereal contains corn, wheat, and rice in the ratio of 3 to 4 to 2. If a box of cereal contains 225 g of corn, how much rice does it contain?

**21.** David can saw a log into three pieces in 7 min. If he continues sawing at a constant rate, how long will it take him to saw a similar log into six pieces?

**22.** The height of an object compared to the length of its shadow is constant for all objects at any given time.

$$\frac{\text{tree height}}{\text{length of shadow}} = \frac{\text{student height}}{\text{length of shadow}}$$




Use this information to help answer the following questions.

**a)** If a 15-m tree casts a 9-m shadow, what is the height of a student who casts a 1.08-m shadow?

**b)** If a 50-m tower has a shadow 16 m long, how long is the shadow of a student who is 1.5 m tall? Give your answer to the nearest centimetre.