

Warm Up Grade 8



1) In the NHL, the ratio of shots taken to the goals scored by an all-star player is 9:2. The player has a 50-goal season. How many shots did he take?

$$\begin{array}{l} \text{Shots} : \text{Goals} \\ 9 : 2 \\ \times 25 \quad \downarrow \quad \times 25 \\ \boxed{225} : 50 \end{array}$$

The player took 225 shots.

$$1 \text{ cm} = 50 \text{ km}$$

2) The scale on a map of Manitoba is 1 : 5 000 000. This means 1 cm on the map represents 5 000 000 cm actual distance. The map distance between two towns is 3.4 cm. What is the actual distance between the two towns?

$$\begin{array}{l} \text{Map} : \text{Actual} \\ 1 \text{ cm} : 5\,000\,000 \text{ cm} \\ \times 3.4 \quad \downarrow \quad \times 3.4 \\ 3.4 \text{ cm} : \boxed{17\,000\,000} \end{array}$$

OR

$$\begin{array}{l} 1 \text{ cm} : 50 \text{ km} \\ \times 3.4 \quad \downarrow \quad \times 3.4 \\ 3.4 \text{ cm} : \boxed{170 \text{ km}} \end{array}$$



## Extra Practice 8

$$1. a) x:8 = 9:24$$

$\div 3 \quad \div 3$

$$x = 3$$

$$b) y:15 = 7:3$$

$\times 5 \quad \times 5$

$$y = 35$$

$$c) a:8 = 9:4$$

$\times 2 \quad \times 2$

$$a = 18$$

$$d) p:12 = 15:10$$

$$p:12 = 3:2$$

$\times 6 \quad \times 6$

$$p = 18$$

$$e) b:5 = 18:6$$

$$= 9:3$$

$$b:5 = 3:1$$

$\times 5 \quad \times 5$

$$b = 15$$

$$f) t:11 = 6:33$$

$\div 3 \quad \div 3$

$$t = 2$$

$$g) 2:7 = 20:d$$

$\times 10 \quad \times 10$

$$d = 70$$

$$h) 34:85 = f:5$$

$\div 17 \quad \div 17$

$$f = 2$$

$$i) 45:30 = 6:s$$

$\div 5 \quad \div 5$

$$9:6 = 6: \underline{\quad}$$

$$3:2 = 6: \underline{4}$$

$$s = 4$$

$$j) 9:36 = c:8$$

$\div 3 \quad \div 3$

$$3:12 = \underline{\quad}:8$$

$$1:4 = 2:8$$

$\times 2 \quad \times 2$

$$c = 2$$

2. Preferred X to Interviewed = P : I

$$\begin{array}{ccc} 7 : 8 = \underline{\quad} : 216 \\ \times 27 \quad \times 27 & & \\ & & 189 \end{array}$$

189 people preferred Brand X

3. Attended : Total = A : T

$$\begin{array}{ccc} 4 : 7 = a : 112 \\ \times 16 \quad \times 16 & & \\ & & a = 64 \end{array}$$

64 students attended the dance

4. Boards : Skis = Boards : Skis

$$\begin{array}{ccc} 5 : 3 = b : 126 \\ \times 42 \quad \times 42 & & \\ & & b = 210 \end{array}$$

210 snowboards were rented

$$5. \text{ Blueprint: actual} = B : a$$

$$1 : 40 = \_ : 3.4$$

$$\begin{array}{cc} \nearrow \times 40 & \div 40 \end{array}$$

$$0.025 : 1 = \underline{0.085} : 3.4$$

$$\begin{array}{cc} \times 3.4 & \times 3.4 \end{array}$$

$$\text{Blueprint: actual} = B : a$$

$$1 : 40 = \_ : 4.8$$

$$0.025 : 1 = \underline{0.12} : 4.8$$

$$\begin{array}{cc} \times 4.8 & \times 4.8 \end{array}$$

The room on the blueprint would be  
0.085 : 0.12 or 8.5cm by 12cm

$$b. \text{ length : width} = \text{length : width}$$

$$5 : 3 = \_ : 45$$

$$\begin{array}{cc} \times 15 & \times 15 \end{array} \quad \begin{array}{c} 75 \\ \cdot \end{array}$$

The length of the painting is 75cm

$$7. \text{ a) trumpet: clarinet} = t : c$$

$$6 : 5 = \underline{\quad} : 10$$

$\times 2 \quad \times 2 \quad \quad \quad \times 2$

12 students take trumpet

$$b) \text{ pian: trumpet} = p : t$$

$$8 : 3 = \underline{\quad} : 12$$

$+4 \quad \times 4 \quad \quad \quad \times 4$

32 students take piano

$$8. \text{ map: actual} = \text{map: actual}$$

$$1 : 40 = \underline{\quad} : 340$$

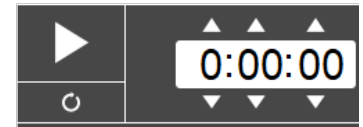
$$0,5 : 20 = \underline{\quad} : 340$$

$\times 17 \quad \times 17 \quad \quad \quad \times 17$

On the map, the distance is 8.5cm.

## Rates and Ratios

A ratio is a comparison between two things.



Rate is the relationship between two different units of measurement, such as meters and seconds, or dollars and hours.

A unit rate is when the second term in the ratio is always 1.

Rates are often written using a slash / which means per.

Ex: km/hr means kilometers per hour  
beats/min means heartbeats per minute  
\$/hr mean the amount of money per hour

The slash (/) or term per means for every one.

Which is a better deal?

Deal 1  
Chips

Vending

$\$1.25$  for 32 grams  $\div 32$   
 $\$0.039 / 1 \text{ gram}$

Deal 2  
Chips

Costco

$\$1.00$  for 28 grams  $\div 28$   
 $\$0.036 / 1 \text{ gram}$

Cheaper

Canadian speed skater Jeremy Wotherspoon, of Red Deer, Alberta, set the world record for the 500 m at the 2004 World Cup in Italy. He skated at an average speed of 14.44 m/s. The white-tailed deer can run at speeds of up to 30 km/h.

Who is faster? How can you find out?

watch units  
what is this in m/s?

Remember 1 km = 1000 m

1 hr = 60 min = 3600 sec

1 min = 60 sec

$$\begin{aligned} 1 \text{ km} &= 1000 \text{ m} \\ 30 \text{ km} &= ? \text{ m} \\ &= 30\,000 \text{ m} \end{aligned}$$



Deer

$$\frac{30 \text{ km}}{1 \text{ hr}} \Rightarrow \frac{30\,000 \text{ m}}{3600 \text{ sec}} \div 3600 \Rightarrow \frac{8.\bar{3} \text{ m}}{1 \text{ sec}}$$

$$\text{Skater } \frac{14.4 \text{ m}}{1 \text{ sec}}$$

Skater is faster



Speedskater  
14.4 m/s

1 hr  
→ 60 min × 60 sec  
3600 s

The speedskater  
is faster

Deer  
30 km  
hr

30 000 m  
3600 sec  
8.3 m/sec

When we compare two things with different units, we have a **rate**.

Here are some rates:

- We need 5 sandwiches for every 2 people.
- Oranges are on sale for \$1.49 for 12.
- Gina earns \$4.75 per hour for baby-sitting.
- There are 500 sheets on one roll of paper towels.

The last two rates are **unit rates**.

Unit Rate compares a quantity to 1 unit.

\*Rates cannot be expressed as percents since they compare two different quantities.

Part a) Express each unit rate using symbols.

1. Serena walks 4 km in 1 hr.  $4 \text{ km/hr}$
2. Sanjit reads 3 books in 1 week.  $3 \text{ book/week}$
3. The tap drips 25 drops in 1 min.  $25 \text{ drops/min}$

Part b) Express as a unit rate.

1. Betty drives her car 150 km in 2 h.  $\div 2 \left( \begin{array}{l} 150 \text{ km} / 2 \text{ hr} \\ 75 \text{ km/hr} \end{array} \right) \div 2$
2. The helicopter travels 180 km in 3 h.

$$\div 3 \left( \begin{array}{l} 180 \text{ km} / 3 \text{ hr} \\ 60 \text{ km/hr} \end{array} \right) \div 3$$

Which sentences are ratios? Which sentences are rates?  
How do you know?

1. The cost of pecans is \$10.89 for each kilogram. *Rate*
2. Three out of every seven people are wearing glasses. *Ratio*
3. Mr. Thompson travelled 620 km in 6 h. *Rate*
4. Each block of a quilt has 5 red patches, 4 yellow patches, and 6 blue patches. *Ratio*
5. In 4 classrooms, there are a total of 65 phones. *Rate*

Maria charged \$15 for 3 h of babysitting.

$$\begin{array}{c} \$15 / 3\text{hr} \\ \div 3 \left( \right) \div 3 \\ \$5 / \text{hr} \end{array}$$

a) What is Maria's rate per hour?

b) How much does Maria charge for 5 h of babysitting?

$$5 \times \left( \begin{array}{c} \$5 / \text{hr} \\ \$25 / 5\text{hr} \end{array} \right) \times 5$$

For 5 hours Maria  
Charges \$ 25

c) How many hours does Maria have to babysit to earn \$50?

$$10 \times \left( \begin{array}{c} \$5 / \text{hr} \\ \$50 / \boxed{10} \text{hr} \end{array} \right) \times 10$$

Maria has  
to babysit  
10 hours to  
earn \$ 50.

# Class/Homework

\$  
first /

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<sup>ac</sup> #5, <sup>ac</sup> #6, <sup>a</sup> #7, <sup>ac</sup> #8, #11a, #12, ~~#13~~

Test

Thursday April ~~24~~ on Unit 5 Percents, Ratios and Rates

To find unit rates, we can use diagrams, tables, and graphs.

A printing press prints 120 sheets in 3 min.

- a) Express the printing as a unit rate. (diagram)
- b) How many sheets are printed in 1 h?

Use the data in Example 1.  
 How long will it take to print 1000 sheets?

<b>Time (min)</b>	5	10	15	20	25
<b>Sheets Printed</b>					

