# Chapter 1 Unit Pricing and Currency Exchange

### KEY TERMS

- buying rate
- exchange rate
- markup
- promotion
- proportion
- rate
- ratio
- selling rate
- unit price
- unit rate

### GOALS

Both in the workplace and in your daily life, you will need to make decisions about what to buy and how to pay the best price for what you need. In this chapter, you will use some familiar mathematical concepts—including fractions, percent, rate, and ratio—in a new context. You will apply these mathematical ideas to

- learn how to determine which purchase is the best buy, considering quality and quantity as well as unit price;
- investigate sales promotions and compare their effects; and
- convert Canadian dollars into a foreign currency and foreign currencies into Canadian dollars.

## MATH *ON THE JOB*

"In 1997, I moved back to the old family homestead, turning the place into an organic, small plot gardening, herb farm and an informal learning centre. We grow food, flowers, garlic, herbs, and wheatgrass," says Pam Trenholm. Pam is a farmer who operates Brighton Botanicals, located near Hartland, New Brunswick. She attended Hartland High School and later took business courses at Carleton County Vocational School in Woodstock, New Brunswick.

Pam's job includes ordering seeds, selling produce, and planting and caring for crops. Pam needs to fertilize a crop with an organic liquid fertilizer that is mixed with water. Five hundred mL of fertilizer is mixed with 60 L of water. If Pam is using 750 mL of fertilizer, how much water does she need to add? How can Pam use proportional reasoning to solve this problem?

*Pam (right) and her intern check plants to see if they have received enough nutrients.*

Students have used ratios and proportions in previous grades. Activate their prior knowledge by giving students a few minutes to try to solve the question in this scenario themselves. When presenting the solution, you may want to show students that there is more than one method.

**METHOD 1:** Set up a ratio by aligning the same units. Students may have seen this method in science class, where it is called dimensional analysis. Show the students that the same units (mL) should cancel each other out, leaving the desired units (L).

$$\frac{500 \text{ mL}}{750 \text{ mL}} = \frac{60 \text{ L}}{x}$$

To solve for $x$, multiply both sides of the equation by the common denominator, $300x$.

$$750x\left(\frac{500}{750}\right) = \left(\frac{60}{x}\right)750x$$

$$\frac{375\,000x}{750} = \frac{45\,000x}{x}$$

Simplify each side of the equation by dividing by the denominator.

$$500x = 45\,000$$

Divide each side by the coefficient of the variable, 500.

$$\frac{500x}{500} = \frac{45\,000}{500}$$

$$x = 90 \text{ L}$$

**METHOD 2:** Find the unit amount of L/mL first by dividing the numerator by the denominator, 500.

$$\frac{60 \text{ L}}{500 \text{ mL}} = \frac{0.12 \text{ L}}{1 \text{ mL}}$$

For every mL of fertilizer, 0.12 L of water is added. Multiply to find the amount of water needed for 750 g of liquid fertilizer.

$$0.12 \times 750 = 90$$

The farmer must add 90 L of water to 750 g of fertilizer.

Proportional Reasoning


Ratio

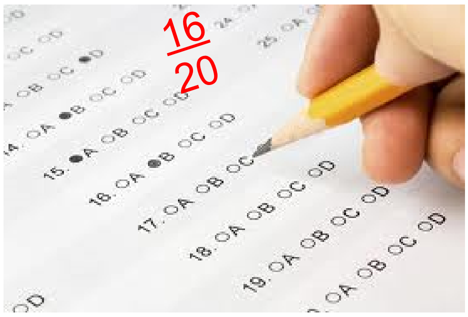
Rate

Proportion

Can you recall wha
these are??

**Ratio:** a comparison between two numbers with the same units

- can be written 2:5 or 2/5
- fraction is popular for calculations
- fraction form is also called a proportion
- ex: mixing oil 50:1

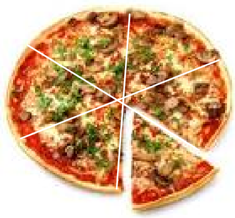




**Rate:** a comparison between two numbers with different units

- ex: km/h; $/hr; $/100 g; words/min
- also known as a rate of change

**Proportion:** a fractional statement of equality between two ratios or rates



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

# EXAMPLE #1:

Engines requiring a mixture of oil and fuel to provide lubrication are called 2-stroke engines. Lisa lives in McCallum, Newfoundland, and uses her boat for transportation. Her boat motor's tank holds 25 L of fuel. The ratio of gasoline to oil required is 50 parts of gasoline to 1 part of oil. Lisa mixes the fuel and oil in a 30-L jerry can before filling up her boat's tank. How much oil should be added to the gasoline?


STEPS... To Solve a Proportion

1. Indicate the variable and set up the ratio.
2. Use ratio to fill in value.
3. Create equal proportions.
4. Solve for the unknown


① $x \rightarrow$ # of L of oil

② $\frac{x \text{ L oil}}{30 \text{ L gas}} = \frac{1 \text{ L oil}}{50 \text{ L}}$ ③ $\times 30$ ④

$x = 0.6$ L $\times 1000$

$x = 600$ mL

# EXAMPLE #2...

Jean-Luc, a builder, works in Kentville, Nova Scotia. He has found that he can arrange the work cubicles of his employees best if the ratio between the length and the width of a room is 3:2. If a room is 6 m long, how wide should the room be?

×2 6 : ? ×2

4

The width of the room should be 4 metres.

SOLUTION...

# Example #3...

If halibut steaks cost \$2.49 for 100 g, how much will it cost to buy 250 g of halibut steaks?

It will cost \$6.23 to buy 250 g of halibut.

SOLUTION...

NOTE: Unit Rate
Cost per unit
ex: \$2.49 per 100 g
$= 2.49/100$
$= \$0.0249/g$