Section 1.2

Unit Price *(continued)*

Lesson 7:

Comparing Costs using Unit Rates

When comparing costs using unit rates, the "better buy" always goes with the lowest unit price.

Example:

A **48-oz** can of tomatoes costs **$2.99**. An **18-oz** can costs **$1.19**. Which is a better buy?

Example:

A **48-oz** can of tomatoes costs **$2.99**. An **18-oz** can costs **$1.19**. Which is a better buy?

(lower unit price per ounce = better buy)

Example:

A **48-oz** can of tomatoes costs **$2.99**. An **18-oz** can costs **$1.19**. Which is a better buy?

(lower unit price per ounce = better buy)

$\frac{\$2.99}{48\text{-}oz}$

Example:

A **48-oz** can of tomatoes costs **$2.99**. An **18-oz** can costs **$1.19**. Which is a better buy?

(lower unit price per ounce = better buy)

$\frac{\$2.99}{48\text{-oz}} = \$0.06229\ldots$

Example:

A **48-oz** can of tomatoes costs **$2.99**. An **18-oz** can costs **$1.19**. Which is a better buy?

(lower unit price per ounce = better buy)

$$\frac{\$2.99}{48\text{-oz}} = \$0.06229\ldots$$

$$\approx \$0.06/\text{oz}$$

Example:

A **48-oz** can of tomatoes costs **$2.99**. An **18-oz** can costs **$1.19**. Which is a better buy?

(lower unit price per ounce = better buy)

$$\frac{\$2.99}{48\text{-oz}} = \$0.06229\ldots$$

$$\approx \$0.06/\text{oz}$$

$$\frac{\$1.19}{18\text{-oz}} = \$0.066111\ldots$$

Example:

A **48-oz** can of tomatoes costs **$2.99**. An **18-oz** can costs **$1.19**. Which is a better buy?

(lower unit price per ounce = better buy)

$$\frac{\$2.99}{48\text{-oz}} = \$0.06229\ldots$$

$$\approx \$0.06/\text{oz}$$

$$\frac{\$1.19}{18\text{-oz}} = \$0.066111\ldots$$

$$\approx \$0.07/\text{oz}$$

Example:

A **48-oz** can of tomatoes costs **$2.99**. An **18-oz** can costs **$1.19**. Which is a better buy?

(lower unit price per ounce = better buy)

$\frac{\$2.99}{48\text{-oz}} = \$0.06229\ldots$

$\approx \$0.06/\text{oz}$

price per ounce is lower.

$\therefore$ it is the better buy

$\frac{\$1.19}{18\text{-oz}} = \$0.066111\ldots$

$\approx \$0.07/\text{oz}$

Lesson 8:

Solving Problems with Proportions or Unit Prices

Example 3:
Solve using proportions

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	
1 m	$8.42
1.75 m	

Example 3:
Solve using proportions

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

$$\frac{\text{price}}{\text{length}} = \frac{\text{price}}{\text{length}}$$

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	
1 m	$8.42
1.75 m	

Example 3:
Solve using proportions

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

$$\frac{\text{price}}{\text{length}} = \frac{\text{price}}{\text{length}}$$

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	
1 m	$8.42
1.75 m	

$$\frac{\$8.42}{1\text{ m}} = \frac{\$x}{0.5\text{ m}}$$

Example 3:
Solve using proportions

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	
1 m	$8.42
1.75 m	

$\frac{\text{price}}{\text{length}} = \frac{\text{price}}{\text{length}}$

$\frac{\$8.42}{1\text{ m}} = \frac{\$x}{0.5\text{ m}}$

$\frac{8.42}{1} = \frac{x}{0.5}$

$x = 4.21$

Example 3:
Solve using proportions

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	$4.21
1 m	$8.42
1.75 m	

$\frac{\text{price}}{\text{length}} = \frac{\text{price}}{\text{length}}$

$\frac{\$8.42}{1\text{ m}} = \frac{\$x}{0.5\text{ m}}$

$\frac{8.42}{1} = \frac{x}{0.5}$

$x = 4.21$

Example 3:
Solve using proportions

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	$4.21
1 m	$8.42
1.75 m	

price / length = price / length

$\frac{\$8.42}{1\text{ m}} = \frac{\$x}{0.5\text{ m}}$

$\frac{8.42}{1} = \frac{x}{0.5}$

$x = 4.21$

$\frac{\$8.42}{1\text{ m}} = \frac{\$x}{1.75\text{ m}}$

Example 3:
Solve using proportions

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	$4.21
1 m	$8.42
1.75 m	

price / length = price / length

$\frac{\$8.42}{1\text{ m}} = \frac{\$x}{0.5\text{ m}}$

$\frac{8.42}{1} = \frac{x}{0.5}$

$x = 4.21$

$\frac{\$8.42}{1\text{ m}} = \frac{\$x}{1.75\text{ m}}$

$\frac{8.42}{1} = \frac{x}{1.75}$

$x = 14.74$

Example 3:
Solve using proportions

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	$4.21
1 m	$8.42
1.75 m	$14.74

$\frac{\text{price}}{\text{length}} = \frac{\text{price}}{\text{length}}$

$\frac{\$8.42}{1\text{ m}} = \frac{\$x}{0.5\text{ m}}$

$\frac{8.42}{1} = \frac{x}{0.5}$

$x = 4.21$

$\frac{\$8.42}{1\text{ m}} = \frac{\$x}{1.75\text{ m}}$

$\frac{8.42}{1} = \frac{x}{1.75}$

$x = 14.74$

Example 3:
Alternate method using unit price

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

unit price →

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	
1 m	$8.42
1.75 m	

Cost of fabric = unit price x length of fabric

Example 3:
Alternate method using unit price

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	
1 m	$8.42
1.75 m	

unit price →

Cost of fabric = unit price x length of fabric

$X = (\$8.42)(0.5) = \$4.21$

Example 3:
Alternate method using unit price

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	$4.21
1 m	$8.42
1.75 m	

unit price →

Cost of fabric = unit price x length of fabric

$X = (\$8.42)(0.5) = \$4.21$

Example 3:
Alternate method using unit price

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	$4.21
1 m	$8.42
1.75 m	

unit price →

Cost of fabric = unit price x length of fabric

$X = (\$8.42)(0.5) = \$4.21$

$X = (\$8.42)(1.75) = \$14.74$

Example 3:
Alternate method using unit price

Shirin is the manager of a fabric store and is training a new employee. Shirin wants to make an easy reference chart that lists the prices of different lengths of a fabric. One metre of the fabric costs $8.42. Fill in the rest of the chart.

FABRIC COST BY LENGTH	
Length of fabric	*Cost of fabric*
0.5 m	$4.21
1 m	$8.42
1.75 m	$14.74

unit price →

Cost of fabric = unit price x length of fabric

$X = (\$8.42)(0.5) = \$4.21$

$X = (\$8.42)(1.75) = \$14.74$

Check your understanding:

Build Your Skills

pg. 29
#4 to 6

pg. 31
#7 to 9

Practise Your New Skills

pg. 32 - 35
1 to 8

4. *La Boutique du Livre* is a francophone bookstore in St. Boniface, MB. It sells notebooks in packages of 12 for $15.48. Another bookstore sells the same notebooks in packages of 15 for $19.65. Which is the better price?

$\frac{\$15.48}{12 \text{ books}} = \$1.29 / \text{book}$

$\frac{\$19.65}{15 \text{ books}} = \$1.31 / \text{book}$

The price at La Boutique du Livre is better.

5. Which is the better buy: 6 muffins for $7.59, or one dozen muffins for $14.99?

$$\frac{\$7.59}{6} = \$1.265 \approx \$1.27/\text{muffin}$$

$$\frac{\$14.99}{12} = \$1.2491\ldots \approx \$1.25/\text{muffin}$$

* This is the better buy.

6. Johnny can buy two 8-foot pieces of 2" by 4" lumber at $2.60 each, or three 6-foot pieces for $1.92 each. Which is the better buy per foot?

two 8-foot pieces

$$\frac{\$2.60}{8\text{ ft}} = \$0.325 \approx \$0.33/\text{ft}.$$

three 6-foot pieces

$$\frac{\$1.92}{6\text{ ft}} = \$0.32/\text{ft}.$$

} the 6 ft pieces have a lower unit price per foot.

7. Sasha is a landscape gardener. He sees that a 200-foot roll of string trimmer line costs $18.75. A 150-foot roll of line costs $15.21.

a) Which roll of line is the least expensive per foot?

$\frac{\$18.75}{200 \text{ ft.}} = \$0.09375/\text{ft.} \approx \$0.09/\text{foot}$

$\frac{\$15.21}{150 \text{ ft.}} = \$0.1014/\text{ft.} \approx \$0.10/\text{foot}$

The 200-foot roll is less expensive per foot.

b) What is the difference in price, per foot?

$$\begin{array}{r} \$0.10 \\ -\$0.09 \\ \hline \$0.01 \text{ per foot} \end{array}$$

8. If $2\frac{1}{2}$ kg of tomatoes cost \$8.25, how much will you pay for 7 kg?

$2\frac{1}{2} = 2.5$

$\frac{\$8.25}{2.5\text{ kg}} = \$3.30/\text{kg}$

$(\$3.30/\text{kg})(7\text{ kg})$

$= \$23.10$

Unit price method

$\frac{\$8.25}{2.5} = \frac{x}{7}$

$\frac{2.5x}{2.5} = \frac{\$57.75}{2.5}$

$x = \$23.10$

Proportion method

9. If Wayne bought 5 litres of gas for his lawnmower for $5.45, how much would he have to pay to fill his car with 48 litres of gas?

$\frac{\$5.45}{5L} = \$1.09/L$

$(\$1.09/L)(48\,L)$

$= \$52.32$

Unit price method

$\frac{\$5.45}{5} = \frac{x}{48}$

$\frac{5x}{5} = \frac{\$261.60}{5}$

$x = \$52.32$

Proportion method

PRACTISE YOUR NEW SKILLS

1. During the summer, Dean works as a cashier in a store near Saskatchewan's Greenwater Lake Provincial Park. The store sells a case of 12 bottles of water for $8.50 and individual bottles of the same brand of water for $1.55.

   a) Approximately how much does each bottle of water in the case of 12 cost?

   $\frac{\$8.50}{12} = \$0.7083... = \$0.71 / \text{bottle}$

   b) How much would a customer save by buying a case of water, rather than 12 individual bottles?

   $12 \times \$1.55 = \$18.60$

   $- \ 8.50$

   $= \$10.10$ saved by buying the case.

2. Maureen purchased enough carpet to cover a rectangular room measuring 7 metres by 12 metres. The carpet costs $8.15 per square metre.

a) How much carpet did Maureen buy?

Area = L x W

= (7m) x (12m)

= 84 square metres of carpet

b) How much did the carpet cost?

$8.15 x 84 = $684.60

3. Tyler is a self-employed sheet metal worker. He purchases 25 sheets of aluminum that measure 4 feet by 8 feet. The cost is $4000.00 before tax and shipping.

a) How much does 1 sheet cost?

$$\frac{\$4000.00}{25 \text{ sheets}} = \$160.00 \text{ per sheet}$$

b) What is the price per square foot?

$$1 \text{ sheet} = (4 \text{ ft}) \times (8 \text{ ft}) = 32 \text{ square feet}$$

$$\frac{\$160.00}{32 \text{ ft}^2} = \$5.00/\text{square foot}$$

4. A painting business buys 3-inch wide paintbrushes from a supplier in cases of 6. One case costs $31.29.

a) How much do two brushes cost?

Unit price : $\frac{\$31.29}{6 \text{ brushes}} = \$5.215 / \text{brush}$

($5.215 / brush) x (2 brushes)

= $10.43 for 2 brushes

b) If a customer buys two or more cases, the supplier reduces the price of the case by 10 percent. How much would 3 cases of paintbrushes cost? How much would each brush cost?

3 cases of 6 = 18 brushes

Total cost = (3 cases) x ($31.29) x (0.90) = $84.48

Unit price = $\frac{\$84.48}{18} = \$4.69$ per brush

5. Which is the better buy: 8 ounces of Brie cheese for $4.95 or 12 ounces for $7.49?

① ② ①

① $\frac{\$4.95}{8\text{ oz.}} = \$0.61875/\text{oz.}$

② $\frac{\$7.49}{12} = \$0.62416\ldots/\text{oz.}$

Option ① is the better buy.

6. Debbie is a cook in a restaurant that is open 6 days a week. She is responsible for recording and monitoring the amount of money she spends on food. In the summer, she uses an average of 9 loaves of bread per day.

a) On average, how many loaves of bread does Debbie use each week?

(9 /day) x (6 days) = 54 loaves

b) If bread costs $1.25 per loaf to buy from a wholesale distributor, how much money should Debbie budget to purchase it, for the month of June? Assume that there are just 4 weeks in June.

($1.25) x (54) x (4) = $270.00

7. The cost of a 355-mL can of juice is $1.25 in a vending machine. A 1.89-L carton of the same juice costs $3.89 at the grocery store. How much would you save per mL if you bought juice from the grocery store instead of the vending machine? (Hint: 1 L equals 1000 mL.)

(1) (2)

(1) $\frac{\$1.25}{355\text{ mL}} = \$0.00352\ldots \text{ per mL}$

(2) $1.89\text{ L} = 1.89 \times 1000 = 1890\text{ mL}$

$\frac{\$3.89}{1890\text{ mL}} = \$0.00205\ldots \text{ per mL}$

You would save approximately $\$0.00352 - \$0.00205$

$= \$0.00147$ per mL

8. Patricio is ordering cartons of detergent for resale in his store. He can order a carton of 12 for $34.68 plus $5.45 for delivery, or a carton of 18 for $51.30 plus $6.25 for delivery. Which is a better buy, and by how much per unit?

① $\$34.68 + \$5.45 = \$40.13$, $\frac{\$40.13}{12} = \$3.344\ldots = \$3.34$/unit

② $\$51.30 + \$6.25 = \$57.55$, $\frac{\$57.55}{18} = \$3.197\ldots = \$3.20$/unit

The carton of 18 is the better buy by $\$3.34 - \$3.20$

$= \$0.14$/unit