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How to Use This Book

This workbook is a companion to *MathWorks 10* student resource, the authorized resource for the WNCN course, Apprenticeship and Workplace Mathematics. The *MathWorks 10 Workbook* is a valuable learning tool when used in conjunction with the student resource, or on its own. It emphasizes mathematical skill-building through worked examples and practice problems.

Here, you will learn and use the practical mathematics required in the workplace. Whether you plan to enroll in college, learn a trade, or enter the workforce after graduating from secondary school, the mathematical skills in this workbook will support you at work and in your daily life.

The *MathWorks 10 Workbook* contains seven chapters. Chapters are divided into sections, each focussing on a key mathematical concept. Each chapter includes the following features.

Review

Each chapter opens with a review of mathematical processes and terms you will need to understand to complete the chapter's lessons. Practice questions are included.

Example

Each example includes a problem and its solution. The problem is solved step by step. Written descriptions of each mathematical operation used to solve the problem are included.

New Skills

The chapter's core mathematical concepts are introduced here. This section often includes real-world examples of where and how the concepts are used.

Build Your Skills

This is a set of mathematical problems for you to solve. It appears after each new concept is introduced and will let you practise the concepts you have just learned about. Build Your Skills questions often focus on workplace applications of mathematical concepts.

Practise Your New Skills

The section's key concepts are presented as review problems at the end of each chapter section.

Chapter Test

At the end of each chapter, a chapter test is provided for review and assessment of learning.

Definitions

New mathematical terms are defined in the sidebar columns. They are also included in the glossary at the back of the book.

Answer Key

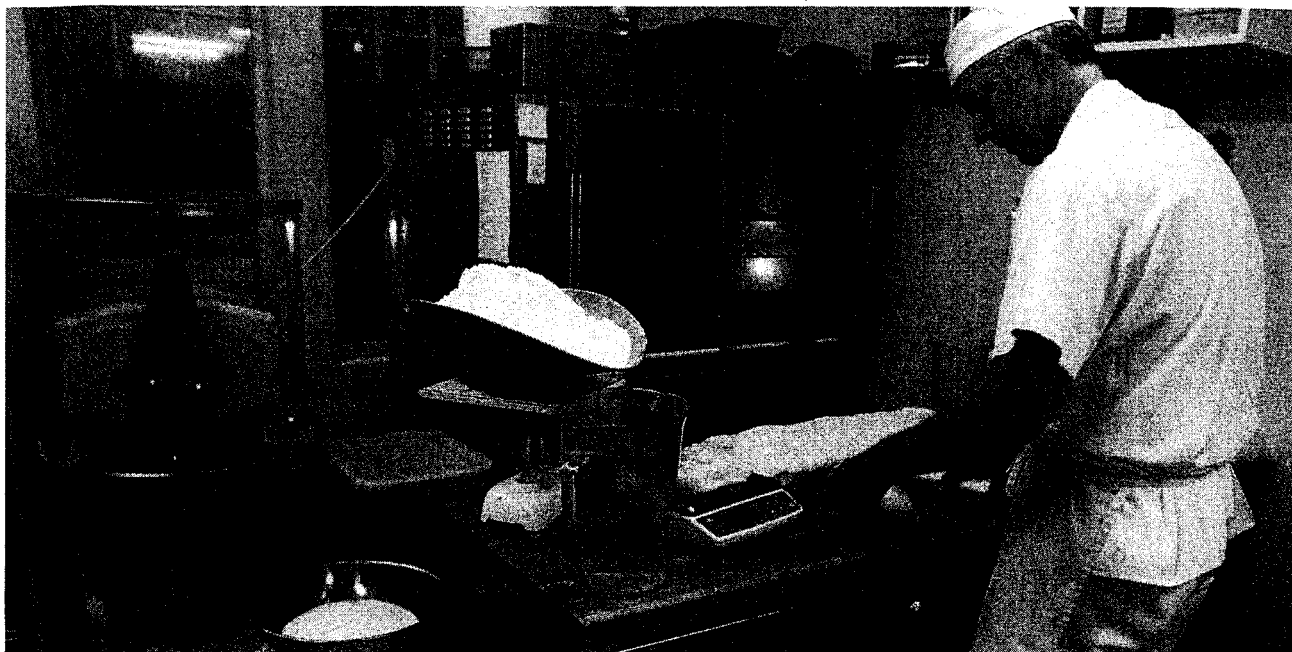
An answer key to this workbook's questions is located at the back of the book.

Glossary

Definitions for mathematical terms are provided here. To increase understanding, some glossary definitions include illustrations.

Chapter 4

Mass, Temperature, and Volume



To make good bread, the ingredients must be measured accurately and the dough stored and baked at the correct temperature. Cam McCaw, a Red Seal pastry chef, turns out hundreds of loaves of bread daily.

Temperature Conversions

4.1

NEW SKILLS: WORKING WITH TEMPERATURE

If you travel to the United States, you will notice that a different temperature scale is used there. The US uses the Fahrenheit scale ($^{\circ}\text{F}$) of the imperial system, while Canada uses the Celsius scale ($^{\circ}\text{C}$) of the SI.

In the SI, water freezes at 0°C and boils at 100°C . In the imperial system, water freezes at 32°F and boils at 212°F . Since water freezes at 0°C and 32°F , the relationship between the two temperature systems can be calculated with the following formulas, where C represents degrees Celsius and F represents degrees Fahrenheit.

$$C = \frac{5}{9}(F - 32) \text{ or } F = \frac{9}{5}C + 32$$

For more details, see page 138 of *MathWorks 10*.

The Celsius scale used to be called the centigrade scale, and it is sometimes referred to this way.

When working with temperatures, convert them to the nearest tenth of a degree.

Example 1

While visiting Florida, Kathy heard a local person say that it had been very cold overnight, as it was only 42° . At first, she thought this was not cold, but then Kathy realized the person meant degrees Fahrenheit. What was the temperature in degrees Celsius?

SOLUTION

Use the following formula, and substitute 42 for F .

$$C = \frac{5}{9}(F - 32)$$

$$C = \frac{5}{9}(42 - 32)$$

$$C = \frac{5}{9}(10)$$

$$C = \frac{50}{9}$$

$$C = \left(5\frac{5}{9}\right)^\circ$$

Convert this mixed numeral to a decimal.

$$5\frac{5}{9} = 5 + \frac{5}{9}$$

$$\frac{5}{9} = 5 \div 9$$

$$\frac{5}{9} \approx 0.6$$

$$5\frac{5}{9} \approx 5.6$$

The temperature is about 5.6°C , which would be very cold in Florida.

BUILD YOUR SKILLS

1. A cake recipe says to bake at 350°F . Your oven only shows temperatures in degrees Celsius. At what temperature should you set your oven?
2. Sophie is making fudge in France, using an American cookbook. She needs to cook the chocolate until the temperature is 238°F , but her thermometer only shows temperatures in degrees Celsius. What temperature does her fudge mixture need to reach?
3. Firefighters can estimate the temperature of a burning fire by the colour of its flame. A clear orange flame has a temperature of about 2190°F . How hot is this in degrees Celsius?

Example 2

Sverre was paving a road with heated tar during a hot summer day. He noted that the external temperature of the tar was 48°C . What was this in degrees Fahrenheit?

SOLUTION

Use the formula for converting degrees Fahrenheit to degrees Celsius, and substitute 48 for C .

$$F = \frac{9}{5}C + 32$$

$$F = \frac{9}{5}(48) + 32$$

$$F = \frac{432}{5} + 32$$

$$F \approx 86.4 + 32$$

$$F \approx 118.4$$

The temperature was approximately 118.4°F .

BUILD YOUR SKILLS

- The normal temperature for a dog is from 99°F to 102°F . Ashley's dog has a temperature of 40°C . Convert the temperature to Fahrenheit to calculate if it falls within the normal range.
- Roger is painting the exterior of a house. He should not apply the paint if the temperature is below 45°F . The temperature is 9°C . Is it safe to apply the paint?

6. Chinook winds are known to cause great changes in temperature over a short period of time. The most extreme temperature change in a 24-hour period occurred in Loma, Montana, on January 15, 1972. The temperature rose from -54°F to 49°F .

a) What was the change in temperature in degrees Fahrenheit?

b) What were the minimum and maximum temperatures in degrees Celsius?

c) What was the change in temperature in degrees Celsius?

A chinook wind is a warm, dry wind that blows east of the Rocky Mountains, often causing significant temperature increases in a short time in winter.

PRACTISE YOUR NEW SKILLS

1. Convert the following temperatures to degrees Fahrenheit.

a) 35°C

b) -8°C

c) 165°C

d) 21°C

e) -40°C

f) 202°C

2. Convert the following temperatures to degrees Celsius.

a) -20°F

b) 80°F

c) 375°F

d) 2°F

e) 0°F

f) -2°F

3. Which is hotter: a blowtorch flame at 1300°C or a candle flame at 1830°F ? By how much is one flame hotter than the other in each scale?

4. When Harry mixes different materials to pave a road, he knows that they must be kept at the following temperatures in degrees Fahrenheit. Calculate the temperatures in degrees Celsius.
- Bituminous material must be between 200°F and 260°F .
 - Water solution must be between 65°F and 100°F .
 - The mixing gel must be between 160°F and 210°F .
5. In 1992, the temperature in Pincher Creek, Alberta, rose from -19°C to 22°C in just one hour due to a chinook wind. What were these temperatures in degrees Fahrenheit?

6. When the human body reaches a temperature of 41°F , it is said to be in a state of “medical emergency.” What is this temperature in degrees Celsius?
7. On May 26, 1991, Mount Logan, YT, recorded the coldest temperature outside of Antarctica at -106.6°F . What is this temperature in degrees Celsius?
8. Some of the tiles on the outside of a space shuttle are able to withstand temperatures of 2300°F . What is this in degrees Celsius?

Mass in the Imperial System

4.2

NEW SKILLS: WORKING WITH WEIGHT

The **mass** of an object refers to the quantity of matter in it, and it remains constant, no matter where the object is located. The **weight** of an object is a measure of the force of gravity on the object. On earth, the mass and the weight of an object are essentially the same; on other planets where the pull of gravity is different, weight and mass will not be the same.

mass: a measure of the quantity of matter in an object

weight: a measure of the force of gravity on an object

The basic units of weight in the imperial system are ton (tn), pound (lb), and ounce (oz).

$$1 \text{ ton (tn)} = 2000 \text{ pounds}$$

$$1 \text{ pound (lb)} = 16 \text{ ounces (oz)}$$

For more details, see page 146 of *MathWorks 10*.

Example 1

Manuela needs 1 pound 2 ounces of Gruyère cheese, 12 ounces of cheddar cheese, and 11 ounces of Swiss cheese for a fondue recipe. How many pounds of cheese does she need in all?

SOLUTION

Add pounds to pounds and ounces to ounces.

$$\begin{array}{r} 1 \text{ pound} + 2 \text{ ounces} \\ + 12 \text{ ounces} \\ + 11 \text{ ounces} \\ \hline 1 \text{ pound } 25 \text{ ounces} \end{array}$$

Change 25 ounces to pounds.

$$16 \text{ ounces} = 1 \text{ pound}$$

$$25 \text{ ounces} = (16 + 9) \text{ ounces}$$

$$25 \text{ ounces} = 1 \text{ pound } 9 \text{ ounces}$$

Total weight = 1 pound 25 ounces

Total weight = 1 pound + 1 pound 9 ounces

Total weight = 2 pounds 9 ounces

Manuela needs 2 lb 9 oz of cheese for her recipe.

ALTERNATIVE SOLUTION 1

Change 1 pound 2 ounces to ounces.

$$1 \text{ lb } 2 \text{ oz} = 16 \text{ oz} + 2 \text{ oz}$$

$$1 \text{ lb } 2 \text{ oz} = 18 \text{ oz}$$

Add all the weights.

$$18 \text{ oz} + 12 \text{ oz} + 11 \text{ oz} = 41 \text{ oz}$$

Change to pounds by dividing by 16.

$$41 \text{ oz} = 41 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}}$$

$$41 \text{ oz} = \left(\frac{41}{16}\right) \text{ lb}$$

$$41 \text{ oz} = \left(2 \frac{9}{16}\right) \text{ lb}$$

$$41 \text{ oz} = 2 \text{ lb } 9 \text{ oz}$$

ALTERNATIVE SOLUTION 2

You could also change the ounces to pounds and work with decimals or fractions.

1 lb 2 oz of Gruyère equals 1 plus $\frac{2}{16}$ lb, or 1.125 lb.

12 oz of cheddar equals $\frac{12}{16}$ lb, or 0.75 lb.

11 oz of Swiss equals $\frac{11}{16}$ lb, or 0.6875 lb.

$$\text{Total weight} = 1.125 + 0.75 + 0.6875$$

$$\text{Total weight} \approx 2.56 \text{ lb}$$

BUILD YOUR SKILLS

1. Rochelle gave birth to twin boys weighing 6 lb 5 oz and 5 lb 14 oz. What was their total weight?
2. The weight of water is approximately 2 pounds 3 ounces per litre. How much will 8 litres of water weigh?
3. If a basket of raspberries weighs 12 ounces and you need 4 pounds to make jam, how many baskets do you need to buy?

Example 2

The cab of Arthur's semi-trailer truck weighs 8.7 tons and the trailer weighs 6.4 tons. If the loaded gross weight of the truck is 21.3 tons, what is the weight of the load:

- a) in tons?
- b) in pounds?

SOLUTION

- a) The total weight of the truck is found by adding the weight of the cab and the trailer.

$$8.7 \text{ tn} + 6.4 \text{ tn} = 15.1 \text{ tn}$$

Subtract this amount from the gross weight to get the weight of the load.

$$21.3 \text{ tn} - 15.1 \text{ tn} = 6.2 \text{ tn}$$

The weight of the load is 6.2 tons.

- b) Since 1 ton equals 2000 pounds, find the weight in pounds by multiplying.

$$6.2 \text{ tn} = 6.2 \text{ tn} \times \frac{2000 \text{ lb}}{1 \text{ tn}}$$

$$6.2 \text{ tn} = 12\,400 \text{ lb}$$

The weight of the load is 12 400 pounds.

BUILD YOUR SKILLS

- An elevator has a maximum load restriction of 1.5 tons. Is it safe for two tile layers weighing 195 lb and 210 lb to load it with 65 boxes of tile weighing 42 lb each?
- A small truck weighs approximately 1300 lb. It is loaded with cement slabs that weigh 150 lb each. If the maximum loaded weight of the truck is 2.75 tons, how many slabs can be loaded?
- Kurt is planting wheat at the rate of 90 pounds per acre. If he plans to plant 320 acres of wheat, how many tons of wheat will he use?

Example 3

A 12-ounce can of vegetables costs \$1.49. A 1 lb 2-oz can of the same vegetables costs \$2.19. Which is the better buy?

SOLUTION

Use unit pricing to find the cost per ounce.

12 ounces cost \$1.49.

$$12 \text{ oz} = \$1.49$$

$$\left(\frac{12}{12}\right) \text{ oz} = \frac{\$1.49}{12}$$

$$1 \text{ oz} = \frac{\$1.49}{12}$$

$$1 \text{ oz} = \$0.1242$$

1 lb 2 oz costs \$2.19.

$$1 \text{ lb } 2 \text{ oz} = 16 \text{ oz} + 2 \text{ oz}$$

$$1 \text{ lb } 2 \text{ oz} = 18 \text{ oz}$$

$$18 \text{ oz} = \$2.19$$

$$\left(\frac{18}{18}\right) \text{ oz} = \frac{\$2.19}{18}$$

$$1 \text{ oz} = \frac{\$2.19}{18}$$

$$1 \text{ oz} \approx \$0.1217$$

The 1 lb 2-oz can is the better buy.

BUILD YOUR SKILLS

7. An 18-oz jar of peanut butter costs \$3.29, a 28-oz jar costs \$4.79, and a 2.5-lb jar costs \$5.99. Which is the best buy?
8. If knitting yarn costs \$6.24 per 3-oz skein, how much will it cost to knit a sweater that requires 1 pound of yarn? (You cannot buy partial skeins.)

9. About 200 cocoa beans are used to make 1 lb of chocolate. Beans are shipped in 200-lb sacks, which contain about 88 000 beans. How many 1.5-oz chocolate bars can be made from one sack of beans?

Example 4

Valérie bought 4 pounds 6 ounces of steak for dinner at \$2.74/lb. After removing the excess fat, she had only 4 pounds of meat. What was her true cost per pound?

SOLUTION

Change 6 ounces to pounds.

$$1 \text{ lb} = 16 \text{ ounces}$$

$$6 \text{ oz} = (6 \div 16) \text{ lb}$$

$$6 \text{ oz} = 0.375 \text{ lb}$$

She bought 4.375 pounds of meat at \$2.74/lb.

Total cost:

$$4.375 \times \$2.74 = \$11.99$$

Since only 4 pounds were usable, calculate how much each pound cost her.

$$\$11.99 \div 4 = \$3.00$$

Valérie paid approximately \$3.00/lb for the steaks.

BUILD YOUR SKILLS

10. Zara buys 8 pounds 12 ounces of strawberries at \$1.98/lb. What is her true cost per pound if 10% of the berries rot before she uses them?
11. Mark bought 8 bags of sand, each weighing 25 lb, for \$1.68/bag. One bag ripped and he lost all the sand. What was his true price per pound of sand?
12. Alyson paid \$28.45 for 24 ounces of coffee beans, but when she checked, the actual weight was 22 ounces. What was her true cost per ounce?

PRACTISE YOUR NEW SKILLS

1. Calculate the conversions.

a) 24 oz = _____ lb

b) 7890 lb = _____ tn

c) 54 oz = _____ lb _____ oz

d) 6 lb 2 oz = _____ oz

e) 4.54 tn = _____ lb

f) 654 oz = _____ lb _____ oz

2. What is the total weight, in pounds and ounces, of six books on a shelf if they weigh 12 oz, 1 lb 7 oz, 1 lb 2 oz, 15 oz, 9 oz, and 1 lb 3 oz?

3. A bakery uses a recipe for oatmeal cookies that calls for 1 lb 4 oz of flour to make 9 dozen cookies. How many ounces of flour are needed to make 3 dozen cookies?

4. Kris needs to transport 5 slabs of concrete to an apartment work site. If each slab weighs 46 pounds, Kris weighs 195 pounds, and the truck weighs 1.5 tons, what is the total weight of the loaded truck in pounds?

5. Harinder is concerned about the weight that paint might add to a delicate structure he built. He estimates that he needs 1.5 gal of paint and that the structure can withstand 15 lb of weight. The weight of a particular paint is 9 lb/gal. When it dries, the weight is only 5.4 lb/gal. Can Harinder paint his structure without having it collapse?

6. U-pick organic blueberries sell for \$20.00 for a 12-pound box.
- How much would 1 pound cost?

 - How much would 12 ounces cost?
7. What is the true cost per pound of a 10-pound box of oranges if the original price of the box was \$12.99 and $\frac{1}{4}$ of them had to be thrown away because they were mouldy?

Mass in the Système International

4.3

NEW SKILLS: WORKING WITH SI UNITS OF MASS

In the Système International (SI), the **kilogram** is the basic unit of mass, but it is commonly used for weight as well.

$$1000 \text{ grams (g)} = 1 \text{ kilogram (kg)}$$

$$1000 \text{ milligrams (mg)} = 1 \text{ gram}$$

$$1 \text{ tonne (t)} = 1000 \text{ kilograms}$$

For more details, see page 154 of *MathWorks 10*.

Example 1

A recipe for cornbread calls for 120 g of flour, 170 g of cornmeal, and 50 g of sugar. If you double the recipe, what is the total weight of the dry ingredients?

SOLUTION

You can either add the weights together and then double the sum, or double the weights and then add them together.

$$\text{Flour: } 2 \times 120 \text{ g} = 240 \text{ g}$$

$$\text{Cornmeal: } 2 \times 170 \text{ g} = 340 \text{ g}$$

$$\text{Sugar: } 2 \times 50 \text{ g} = 100 \text{ g}$$

Add the weights of all the ingredients.

$$240 \text{ g} + 340 \text{ g} + 100 \text{ g} = 680 \text{ g}$$

There are 680 g of dry ingredients in the doubled recipe.

kilogram: the mass of one litre of water at 4°C

Note that a tonne (t) is not the same as a ton (tn). A tonne is sometimes referred to as a metric ton.

BUILD YOUR SKILLS

1. What is the total weight of a loaded truck if the truck weighs 2.6 tonnes and it is loaded with 15 skids of boxes that weigh 210 kilograms each? Give your answer in tonnes.

2. Irène needs 1.6 kg of tomatoes to make her grandmother's recipe for ratatouille. She has baskets of tomatoes that weigh 256 g, 452 g, 158 g, and 320 g. How many more grams of tomatoes does she need?

3. Genoa salami sells for \$1.79/100 g at the deli.
 - a) How much will 350 g cost?

 - b) What is the price per kilogram?

**NEW SKILLS: WORKING WITH MASS/WEIGHT
CONVERSION BETWEEN IMPERIAL AND SI**

In this section, you will need to work with the relationship between the SI and the imperial units of weight. One kilogram weighs about 2.2 lb. You can also use this information to convert from grams to ounces and tonnes to tons.

For more details, see page 157 of *MathWorks 10*.

Example 2

Lorinda is baking apple pies. According to her recipe, she needs 6 pounds of apples. The bag of apples she bought only shows the weight in kilograms. How many kilograms of apples does she need?

SOLUTION

$$2.2 \text{ lb} = 1 \text{ kg}$$

$$1 \text{ lb} = \frac{1 \text{ kg}}{2.2}$$

$$6 \text{ lb} = 6 \times \frac{1 \text{ kg}}{2.2}$$

$$6 \text{ lb} \approx 2.7 \text{ kg}$$

She will need approximately 2.7 kg of apples.

To estimate a conversion from pounds to kilograms, you can think of a pound as being about $\frac{1}{2}$ kg.

BUILD YOUR SKILLS

4. A recipe calls for 180 g of flour. How much is this in ounces?
5. A baby weighed 7 pounds 12 ounces at birth. How much did it weigh in grams?
6. Chen weighs 68 kg. How much does he weigh in pounds?

Example 3

The cost of bananas is \$0.49/lb at one store, but you see an advertisement for bananas on sale at another store for \$1.05/kg. Which is the better buy?

SOLUTION

Convert the price of bananas at the first store to kilograms.

1 lb costs \$0.49.

1 kg = 2.2 lb

Therefore, 1 kg costs 2.2 times the cost of 1 lb.

$$2.2 \times \$0.49 = \$1.08$$

One kilogram of bananas at the first store costs about \$1.08. The sale at the second store is a better buy.

BUILD YOUR SKILLS

7. How much does 1 pound of beef cost if the butcher shop sells it for \$9.74/kg?

8. Which is the better buy: 200 g of coffee beans at \$3.85 or 1 pound at \$9.60?

9. The dosage of a certain medicine is 0.05 mg/kg of weight. Tom weighs 185 lbs.

a) How many milligrams of the medicine should he take?

b) If the medicine costs \$1.95/mg, what will his dosage cost?

PRACTISE YOUR NEW SKILLS

1. Convert the following weights.

a) 2.5 t = _____ kg

b) 2.8 kg = _____ g

c) 125 g = _____ kg

d) $2.4 \text{ g} = \underline{\hspace{2cm}} \text{ kg}$

e) $1 \text{ t} = \underline{\hspace{2cm}} \text{ lb}$

f) $3.6 \text{ tn} = \underline{\hspace{2cm}} \text{ kg}$

2. How many tons are in 1 tonne?

3. What is the total weight in grams of 3 packages of nuts weighing 1.2 kg, 0.75 kg, and 1.5 kg?

4. Win weighs 78 kg and his dog weighs 18 kg. If his truck weighs 1.9 t and there are 5 boxes of books each weighing 9.8 kg in the truck, what is the total weight of the truck, including Win, his dog, and the books?

5. Karen is making a batch of potato soup. She needs 8 potatoes, and each potato weighs about 375 g. How many pounds of potatoes does she need?

6. If a 10-lb bag of grass seed costs \$75.45, how much does the seed cost per kilogram?

7. How many quarter-pound (before cooking) hamburgers can you make from 1.9 kg of ground beef?

Making Conversions

4.4

NEW SKILLS: WORKING WITH CONVERSIONS BETWEEN MEASURES OF VOLUME AND WEIGHT

You have converted measures from one unit to another, within the SI or imperial system, or between them.

Here, you will convert from a unit of volume to a unit of weight. For example, grain is often measured in bushels, a volume measure, but its weight may be needed to judge whether it is a safe load for a truck. Each grain has a different weight, so conversions between bushels and weight depend on knowing the conversion factor.

1 bushel = 2220 in³
or approximately
8 gallons.

For more details, see page 162 of *MathWorks 10*.

Example 1

How many bushels (bu) of flax seed are there in 2.4 tonnes, if the conversion factor is 39.368 bushels/tonne?

SOLUTION

A conversion factor of 39.368 means that there are 39.368 bushels of flax seed per tonne. To find the number of bushels, multiply.

$$2.4 \text{ t} \times \frac{39.368 \text{ bu}}{1 \text{ t}} = x \text{ bu}$$

$$2.4 \times 39.368 = 94.5$$

There are approximately 94.5 bushels of flax seed.

BUILD YOUR SKILLS

1. Laila bought 5 bushels of sunflower seeds. If the conversion factor is 73.487 bu/t, what is the weight of the sunflower seeds:
 - a) in kilograms?

 - b) in pounds?

2. The conversion factor for white beans is 36.744, and for corn it is 39.368. Which weighs more per unit volume?

3. If Jore gets \$195.76 per metric ton for wheat, how much does he earn per bushel (conversion factor 36.744 bu/t)?

4. If one bushel of triticales grain is about 2220 cubic inches, how many bushels are in a pile that measures approximately 8 feet by 6 feet by 5 feet?

5. How many tonnes of rye are there is 900 bushels if there are 39.368 bushels/tonne?

6. Wheat is 36.744 bushels/tonne and sunflower seeds are 73.487 bushels/tonne. What does this tell you about the relative weights of wheat and sunflower seeds?

**NEW SKILLS: WORKING WITH CONVERSION BETWEEN
SI AND IMPERIAL UNITS OF WEIGHT**

You can use the following equivalencies to convert between SI and imperial units.

$$1 \text{ lb} \approx 0.45 \text{ kg}$$

$$1 \text{ oz} \approx 28.3 \text{ g}$$

$$1 \text{ tn} \approx 0.9 \text{ t}$$

BUILD YOUR SKILLS

7. Alphonse is making chicken kebabs for 14 people. His recipe suggests about 7 oz of chicken per person. At the grocery store, the weight of chicken is labelled in kilograms. How much chicken does Alphonse need to buy?
8. A crane can lift a maximum of 5 t. Sandstone weighs about 150 lb per cubic foot, and a container contains 70 cubic feet of sandstone. Can the crane be used to load the container onto a train?

9. Josephine is sending a gift of a bottle of maple syrup that weighs 3 lb, and 3 packages of smoked salmon jerky that each weigh 100 g. If the package's total weight is less than 2 kg, she can ship it at a cheaper rate. Will she be able to do so?

PRACTISE YOUR NEW SKILLS

1. If 1 bushel is approximately 2220 cubic inches, approximately how many bushels of grain are there in a bin that is 8 feet by 8 feet by 4 feet?

2. A truck has a maximum load limit of 5000 kg. Can it safely carry 230 bushels of canola, if the conversion factor is 44.092 bushels/tonne?

3. How many kilograms are in 1 ton?

4. A sign posted in an elevator says "Maximum capacity 1400 lb." If the average weight of an adult is 80 kg, how many average-weight adults can the elevator carry?

5. Recall that 1000 cubic centimetres equal 1 litre. How many millilitres are in a box that is 10 cm by 5 cm by 3 cm?
6. A hectare (ha) is an area measure of 10 000 square metres. How many hectares are there in a field that is 620 m by 380 m?

CHAPTER TEST

1. Convert the following temperatures.

a) $25^{\circ}\text{C} = \underline{\hspace{2cm}}^{\circ}\text{F}$

b) $25^{\circ}\text{F} = \underline{\hspace{2cm}}^{\circ}\text{C}$

c) $-40^{\circ}\text{C} = \underline{\hspace{2cm}}^{\circ}\text{F}$

d) $-25^{\circ}\text{F} = \underline{\hspace{2cm}}^{\circ}\text{C}$

e) $405^{\circ}\text{F} = \underline{\hspace{2cm}}^{\circ}\text{C}$

f) $45^{\circ}\text{C} = \underline{\hspace{2cm}}^{\circ}\text{F}$

2. A welder's electrical arc has a temperature ranging from 500°C to $20\,000^{\circ}\text{C}$. What is this in degrees Fahrenheit?

3. Convert the following weights.

a) 12 lb 4 oz = _____ oz

b) 2.3 tn = _____ lb

c) 5284 lb = _____ tn _____ lb

d) $3\frac{3}{4}$ lb = _____ oz

e) 165 oz = _____ lb

f) 454 g = _____ lb

4. It is estimated that recycling 1 ton of paper saves about 17 trees. About how many trees are saved if 8254 tons of paper are recycled?

5. Eva bought 3 rainbow trout for dinner. They weighed 3 lb 5 oz, 2 lb 12 oz, and 3 lb 8 oz. She cut off the heads and the tails and was left with 8 lb 2 oz. What was the amount of waste?
6. The weight of a piece of raw silk that is 100 yards long by 1.25 yards wide (standard width) is about 38 pounds. The weight of an equal amount of habutai silk is about 12 pounds. If Katharine bought pieces of raw silk and habutai silk that were both 12.5 yards long, how much would they weigh together?
7. A robin's egg weighs about 70 g. How many eggs would it take to make 1 kilogram?

8. Huang bought 12 boxes of floor tiles that weigh 288 pounds each. How much is this in kilograms?

9. Soybeans have a conversion factor of 36.744 (bu/t). How much do 45 bushels weigh?