

Working with Money

6



Carmen and Adriana are farmers who sell products in bulk at the market.

- A. Many businesses buy supplies in bulk. Why do you think they do this?

- B. What would be an advantage and a disadvantage to buying things in bulk?

6

Getting Started

Hint

A percent is a fraction out of 100.

1. Write each percent as a decimal.

a) 25% = _____

d) 7% = _____

b) 15% = _____

e) 1.5% = _____

c) 47% = _____

f) 12.5% = _____

2. Calculate.

a) 25% of 500 = _____

d) 35% of 300 = _____

b) 6% of 35.50 = _____

e) 2.5% of 50 = _____

c) 10% of 1650 = _____

f) 0.5% of 29 = _____

3. Write each decimal as a percent.

a) 0.65 = _____

d) 0.04 = _____

b) 0.12 = _____

e) 0.055 = _____

c) 0.1 = _____

f) 0.002 = _____

4. Write each fraction as a percent. Round to the nearest tenth.

a) $\frac{2}{5}$ = _____

c) $\frac{1}{3}$ \doteq _____

b) $\frac{5}{8}$ = _____

d) $\frac{4}{3}$ \doteq _____

5. Complete the chart.

Fraction	Decimal	Percent
	0.25	
		30%
$\frac{4}{5}$		
$\frac{9}{8}$		
	1.23	
		5.9%

6. Calculate the total cost of each item, including GST.
To determine GST, calculate 5% of the price.

- a) MP3 player for \$79.99

$$\text{GST: } \$79.99 \times \underline{\hspace{2cm}} = \$ \underline{\hspace{2cm}}$$

$$\text{Total: } \$79.99 + \$ \underline{\hspace{2cm}} = \$ \underline{\hspace{2cm}}$$

- b) laptop for \$549.99

GST:

Total:

Hint

GST stands for Goods and Services Tax. Some provinces have an additional provincial sales tax called PST. Some provinces combine the PST and GST and charge a harmonized sales tax, HST.

7. Calculate.

a) $\frac{1}{4}$ of 500 = $\underline{\hspace{2cm}}$

d) $\frac{3}{5}$ of 300 = $\underline{\hspace{2cm}}$

b) $\frac{1}{3}$ of 30 = $\underline{\hspace{2cm}}$

e) $\frac{1}{5}$ of 200 = $\underline{\hspace{2cm}}$

c) $\frac{1}{10}$ of 1650 = $\underline{\hspace{2cm}}$

f) $\frac{1}{2}$ of 29 = $\underline{\hspace{2cm}}$

8. Suppose you have a coupon for 10% off a meal. Calculate the price of each meal.

a) total: \$56.98 $\$56.98 - (10\% \text{ of } \$56.98)$
 $= \$56.98 - \$ \underline{\hspace{2cm}}$
 $= \$ \underline{\hspace{2cm}}$

b) total: \$19.57 $\$19.57 - (10\% \text{ of } \$19.57)$
 $= \$19.57 - \$ \underline{\hspace{2cm}}$
 $= \$ \underline{\hspace{2cm}}$



9. Sasha likes to tip 15% on the cost of services. Estimate the tip on each purchase.

a) hair cut: \$68 $15\% \text{ of } \$68 = (10\% \text{ of } \$68) + (5\% \text{ of } \$68)$
 $\doteq \$ \underline{\hspace{2cm}} + \$ \underline{\hspace{2cm}}$
 $\doteq \$ \underline{\hspace{2cm}}$

b) taxi fare: \$23 $15\% \text{ of } \$23 = (10\% \text{ of } \$23) + (5\% \text{ of } \$23)$
 $\doteq \$ \underline{\hspace{2cm}} + \$ \underline{\hspace{2cm}}$
 $\doteq \$ \underline{\hspace{2cm}}$

6.1

Calculating Unit Price

Try These

- i) $\$15.90 \div 5 = \$$ _____
ii) $(\$12.00 + \$9.00 + \$21.00) \div 4 = \$$ _____

unit price

the amount of money charged for a unit of an item

Hint

1000 mL = 1 L

Heidi sells cleaning products in bulk at her store. She puts the liquid in large containers and customers can fill their own bottles. How should Heidi display the **unit price** for a cleaner that sells for \$115 for 25 L?

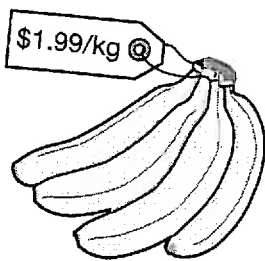
- 1 Calculate the price for each quantity.

Price per litre: $\$115 \div 25 \text{ L} = \$$ _____ /L

Price per 500 mL: $\$$ _____ /L $\div 2 = \$$ _____ /500 mL

Price per 100 mL: $\$$ _____ /L \div _____ = $\$$ _____ /100 mL

- 2 Should Heidi display the price per litre, per 500 mL, or per 100 mL? Why?



Example

Rama advertises bananas for \$1.99 per kilogram. Is this more or less than 59¢ a pound?

Solution

- A. What relationship can you use to determine the unit cost per pound of the bananas?

1 pound \doteq 0.45 kg

$\$$ _____ /kg \times _____ kg/lb \doteq $\$$ _____ /lb

- B. Is \$1.99/kg more or less than 59¢ a pound? _____

REFLECTING

When might it be useful to know the unit price of items?

Practice

1. Calculate each unit price.

a) 12 eggs for \$3.24
\$ _____ per egg

c) \$23.90 for 1 kg of pecans
\$ _____ /100 g

b) \$35.16 for 40 L of gas
\$ _____ /L or _____ ¢/L

d) \$23.90 for 1 kg of pecans
about \$ _____ per pound

2. Raymond needs to order crushed rock for a courtyard.
What is the cost of 4.5 t at \$12.50 per tonne?

3. One brand of salsa is \$5.95 for 650 mL and another is \$4.10 for 350 mL.

a) What is the price per millilitre for each brand?

b) What is the price per 100 mL for each brand?



4. Lise labels her meat prices per pound. Jordan labels his meat prices per kilogram. Calculate the equivalent unit price for each.

Rib steak \$8.80/lb \$ _____ /kg

Sirloin roast \$ _____ /lb \$7.59/kg

Hint

1 kg = 2.21 lb

5. Tanya found these prices for tomato juice:

A: 1.89 L for \$3.99 B: 750 mL for \$2.99 C: 250 mL for 89¢

Which size sells for the lowest unit price?

6.2

Determining the Best Buy

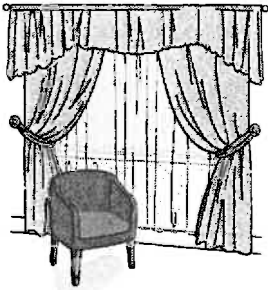
Try These

i) $\$52 \div 5 = \$$ _____

iii) $\$468 \div 18 = \$$ _____

ii) $\$6.25 \div 12 = \$$ _____

iv) $\$899 \div 4 = \$$ _____



Indie is an interior designer. She is choosing fabric for curtains for her client's living room.

- Linen at \$38.25 for 3 yards
- Cotton at \$60.00 for 8 yards

Which fabric has the lower unit price?

- 1 What is the price per yard for each fabric?

Linen: $\$38.25 \div 3 \text{ yards} = \$$ _____ per yard

Cotton: $\$$ _____ \div _____ yards = $\$$ _____ per yard

- 2 Which fabric has the lower unit price? _____

- 3 What other factors might Indie consider when buying fabric?

Example

Osmani is a tour operator. He offers two types of tours of Banff.

- Deluxe Tour offers 90 min of sightseeing for \$36.
- Supreme Tour offers 4 h of sightseeing for \$84.

Which tour offers a better price per hour?

Solution

A. Deluxe Tour unit price: 90 min = _____ h

$\$36 \div$ _____ h = $\$$ _____ /h

Supreme Tour unit price: $\$84 \div$ _____ h = $\$$ _____ /h

- B. Which tour offers the better price per hour?

Hint

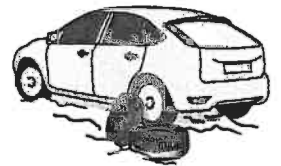
Remember to compare units that are the same.

REFLECTING

Why is the lower unit price sometimes not the best option?

Practice

- Determine the lower unit price.
 - 2000 nails for \$54.99 *or* 5000 nails for \$119.99
 - Swiss cheese at \$4.59 for 170 g *or* havarti at \$2.29/100 g
 - Yogurt: 650 g for \$2.99 *or* 800 g for \$5.59
 - Roast chicken at \$2.29/100 g *or* ham at \$3.29/175 g
 - 3.78 L of house paint for \$39.95 *or* 237 mL for \$6.49
- Candace needs to replace two of her winter tires. She finds the following prices.
 - Main Street Tire: 1 tire for \$82.15
 - Tom's Automotive Shop: 2 tires for \$140.56Which store offers the better price for Candace?
- Henry needs a small amount of paint for a bathroom wall. He can pay either \$32.97 for 3.8 L of paint or \$15.49 for 950 mL. Which would be the better buy? Explain your thinking.



4. Carol-Hui is buying orange juice. Which has the better unit price?

- Concentrated orange juice: \$1.85 for 355 mL; mix with 3 cans (355 mL each) of water to serve
- Ready-to-serve orange juice: \$2.99 for 1.89 L

5. Vince wants to hire a contractor to finish his basement. He got quotes from two companies.

Company name	Experience	Customer satisfaction	Hourly rate	Estimated time	Cost of supplies
Frank & Sons Contractors	well-known and experienced	98%	\$70/h	24 h	\$2000
Design and Build Team	new to the business	79%	\$50/h	28 h	\$2200

a) What would each company charge in total?

b) Which would be the better option? Explain your thinking.

6. Which is the better unit price?

a) pop at \$1.99 for 2 L or 55¢ for 355 mL

b) beef at \$4.99/lb or \$8.50/kg

7. Jayden is a flooring installer. He provides the information below for a client trying to decide what kind of flooring to use.

Type of flooring	Warranty	Unit price	Amount needed
ceramic tile	lifetime	\$6.36/tile	120 tiles
laminated tile	10 years	\$54.01/box	13 boxes



- a) Calculate the total price for each type of flooring.

- b) Which type of flooring do you think the client should choose? Explain your thinking.

8. Corey buys his engine oil online. Which is a better unit price?
3 US gallons for \$35.95 or 5 L for \$29.95

Hint

Remember to use the same units. Use the charts inside the back cover.

9. a) What are some factors to consider when looking for the best buy?

- b) Is the cheaper option always the best buy? Explain your thinking.

6.3

Calculating Discounts and Increases

Try These

- i) 25% of \$800 = \$ _____ ii) 80% of \$1500 = \$ _____

Hilda needs to make room for the summer line in her clothing store. She needs to calculate sale prices for her existing stock and set prices for her new arrivals.

- ① How much will she charge for an \$80 pair of jeans with a discount of 25%?

Discount: $\$80 \times \underline{\hspace{2cm}} = \$ \underline{\hspace{2cm}}$

Sale price: $\$ \underline{\hspace{2cm}} - \$ \underline{\hspace{2cm}} = \$ \underline{\hspace{2cm}}$

- ② Hilda bought a new line of jeans for \$42.50/pair. She will mark them up by 48%. What will she charge for the jeans?

Mark up: $\$42.50 \times \underline{\hspace{2cm}} = \$ \underline{\hspace{2cm}}$

Ticket price: $\$ \underline{\hspace{2cm}} + \$ \underline{\hspace{2cm}} = \$ \underline{\hspace{2cm}}$

- ③ What profit will Hilda make for each pair of jeans sold?

Hilda will make \$ _____ in profit for each pair of jeans sold.

Example 1

Owen is offering a discount on an apartment of $\frac{1}{5}$ off the first month's rent of \$1200. What will the first month's rent be?

Solution 1

Calculate the cost by first calculating the discount amount.

Discount: $\$1200 \times \underline{\hspace{2cm}} = \$ \underline{\hspace{2cm}}$

First month's rent: $\$1200 - \$ \underline{\hspace{2cm}} = \$ \underline{\hspace{2cm}}$

Solution 2

Calculate the cost in one step.

$\frac{1}{5}$ (or 20%) off means $\frac{4}{5}$ (or 80%) of the original price.

First month's rent: $\$1200 \times \underline{\hspace{2cm}} = \$\underline{\hspace{2cm}}$

REFLECTING

Which do you prefer, Solution 1 or Solution 2? Why?

Example 2

Ben bought a house for \$265 000. After one year, it increased in value by 4%. What was the value of Ben's house after one year?

Solution

$$\begin{aligned} \$265\,000 \times (1.00 + \underline{\hspace{2cm}}) &= \$265\,000 \times \underline{\hspace{2cm}} \\ &= \$\underline{\hspace{2cm}} \end{aligned}$$

Hint

If you include 1.00 in the equation, you can skip the step where you add the increase to the original price.

Example 3

Aida paid \$693 wholesale for mirrors that sell for \$990 retail. What discount was she given?

Solution

A. What percent of the original price is the sale price?

$$\frac{\text{sale price}}{\text{original price}} = \text{percent of original price}$$

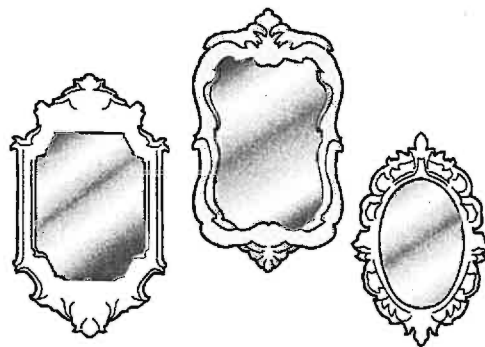
$$\frac{\underline{\hspace{2cm}}}{\underline{\hspace{2cm}}} = \underline{\hspace{2cm}}, \text{ or } \underline{\hspace{2cm}}\%$$

B. What is the discount?

$$100\% - \underline{\hspace{2cm}}\% = \underline{\hspace{2cm}}\%$$

REFLECTING

What could be a general rule for figuring out an increased price in a single calculation?



Practice

1. Complete the chart for these sales offers.

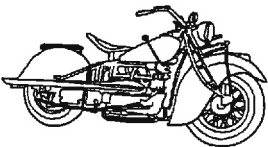
Item	Original price	Discount	New price
computer	\$679.99	15%	
newspaper ad	\$500.00	$\frac{1}{4}$ off	
snowboard	\$455.95	60%	
shoes	\$72.95	20%	

2. Seo Ho is opening a new restaurant and needs to buy plates.
- Supplier 1: 300 plates for \$3400
 - Supplier 2: 300 plates for \$4000 and a 10% discount
- Which supplier is offering the better price?

3. Complete the chart for these salary increases.

Name	Original salary	Percent increase	New salary
Carrie	\$52 000	7%	
Gerry	\$44 500	2%	
Sandra	\$108 200	3.5%	
Andrew	\$82 300	4.5%	

4. In one year, prices in Canada's housing market increased by 5.2%. If a house sold for \$335 576 at the beginning of that year, what could it sell for at the end of that year?



5. Alysha restored an old motorcycle. She paid \$26 000, spent \$3500 on repairs, and sold it for \$37 000. What percent profit did she make?
6. Zoe is opening an organic greenhouse. She paid \$130 wholesale for gardening tools worth \$200 retail. What was the percent discount for the tools she bought?

Mid-Chapter Review

1. Calculate the unit cost for 100 g.
 - a) cheese at \$12.80/kg
 - b) sausage at \$2.89 for 375 g

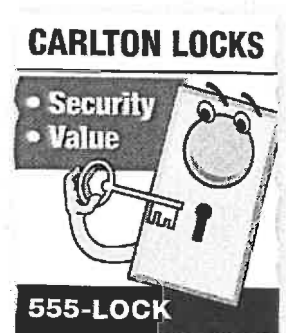
2. Olivia is buying equipment for her wholesale bakery.
 - a) She can get two mixers for \$3396 or three mixers for \$4794. Which option is the lower unit price?

 - b) What factors other than price might Olivia consider when buying mixers?

3. Koli sells 2 kg of frozen turkey breasts for \$32.55 and 300 g of fresh turkey breasts for \$7.89. Which is the lower unit price?

4. Calculate each sale price.
 - a) 35% off \$780
 - b) $\frac{1}{3}$ off \$780
 - c) 5% off \$198
 - d) 12.5% off \$36

5. Peter is a locksmith. After he ran ads in the newspaper, his company's sales increased by 4.2% from the previous year. His sales were \$206 890 the previous year. What were his sales after the ads ran?



6.4

Analyzing Sales Promotions

Try These

i) $2.5 \times \$1.95 = \$$ _____

iii) 80% of \$1200 = \$ _____

ii) $4 \times \$9.50 + \$20 = \$$ _____

iv) 20% off \$1200 = \$ _____

Jack is buying plywood for his cabinetmaking business. Two lumberyards sell $\frac{3}{4}$ inch oak plywood for \$79.98 a sheet, but they offer different promotions.

- Promotion 1: spend more than \$500 and get \$100 off
- Promotion 2: 15% discount off entire purchase

Which promotion is better for Jack if he needs 8 sheets?
if he needs 16 sheets?

- ① If Jack needs 8 sheets of plywood to make new cabinets, which promotion will save him the most money?

$\$79.98 \times 8 \text{ sheets} = \$$ _____

Promotion 1: \$ _____ - \$ _____ = \$ _____

Promotion 2: \$ _____ \times _____ = \$ _____

Promotion _____ saves Jack the most money if he buys 8 sheets.

- ② If Jack wanted to buy 16 sheets of plywood, which option would save him the most money?

$\$79.98 \times 16 \text{ sheets} = \$$ _____

Promotion 1: \$ _____ - \$ _____ = \$ _____

Promotion 2: \$ _____ \times _____ = \$ _____

Promotion _____ saves Jack the most money if he buys 16 sheets.

Example

Kristin is buying six watches as gifts for her friends. The store has two promotions to choose from for watches with a regular price of \$12 each.

- The real deal: buy one, get one half price
- The big discount: $\frac{1}{3}$ off the purchase

Which promotion should Kristin choose?

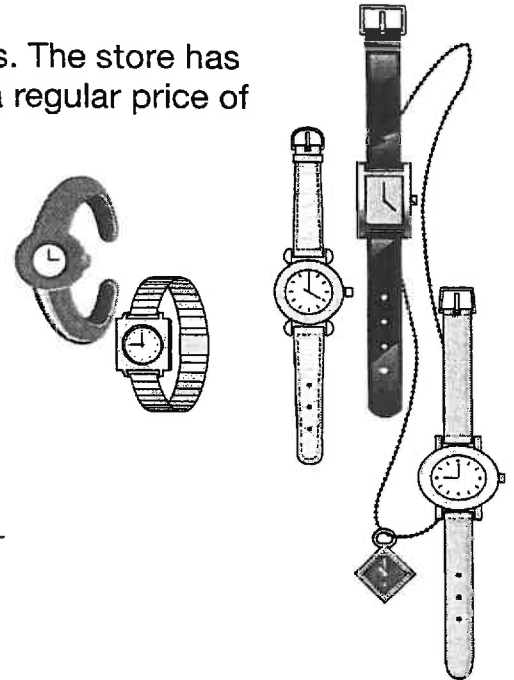
Solution

Calculate the price for each promotion.

The real deal: $\$12 \times 3 + \$ \underline{\hspace{2cm}} \times 3 = \$ \underline{\hspace{2cm}}$

The big discount: $\$12 \times 6 - \frac{1}{3}(\$12 \times 6) = \$ \underline{\hspace{2cm}}$

Kristin should choose the big discount.



Practice

1. Nikki needs eight new sets of linens for her massage therapy business. She checks out the sales at two different stores.
 - Bedding & More: buy 1 get 1 free; regular price \$32.50/set
 - Lydia's Linens: 40% off regular price of \$26.49

a) How much do eight sets of linens cost at each store?

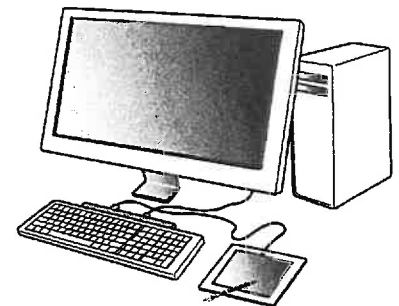
REFLECTING
What other types of sales promotions have you seen?

b) Which store offers the better price? _____

2. Allison is a freelance graphic designer. She needs to buy a new computer for her business. Two stores offer promotions on the same computer.

- \$2899 with a discount of 20%
- \$2779 with a \$250 mail-in rebate

Which is the better price?



3. Troy is going to a technical school in the fall and needs to rent an apartment. He finds two apartments that he likes.

- Apt. 1: \$700/month + $\frac{1}{2}$ month's rent for a damage deposit
- Apt. 2: \$775/month with the first month free

a) If Troy needs the apartment for 12 months, which apartment would be less expensive?

b) If Troy needed the apartment for 24 months, which apartment would be less expensive?



4. Ngor needs to rent a vehicle to drive from Invermere, British Columbia, to Lethbridge, Alberta, and back. The total distance for the round trip is 607 km and will take two days.

- RentCar: \$45.99/day with unlimited mileage
- Car Bud: \$15.85/day plus \$0.12/km

a) Which option seems less expensive, without calculating unit prices? Why?

b) Which option is best for Ngor's situation?

c) If Ngor's trip only took one day, which option would be less expensive?

Solving a Money Puzzle

6.5

Stephen wants to purchase a new hybrid car.

- The base price of the car is \$27 800.
- He would like to purchase the premium package with solar panels for \$3835, leather seats for \$1890, and a remote car starter for \$632.
- GST is 5% of the total purchase price.

Stephen has gone to three different dealerships. Each dealership has a different promotion.

- **Dalia's Dealership:** dealer pays the GST (5%) on the purchase price
- **Dan's Dealership:** manufacturer offers a 1% price reduction and a rebate of \$2000
- **Drake's Dealership:** dealer offers a 1.5% price reduction and \$1500 in fuel vouchers



A. Which dealership offers the lowest price?

B. Which offer is best for the dealership? Why?

6.6

Currency Exchange

Try These

- i) $1.987 \times \$20 = \$$ _____ iii) $\$2000 \times 0.9671 = \$$ _____
 ii) $\$500 \times 0.6789 = \$$ _____ iv) $\$89 \times 0.146 = \$$ _____

rate of exchange

the amount that money is worth from one currency to another. This varies daily.

Trevor will be travelling to the WorldSkills Competition in London, England. He needs to convert his Canadian dollars (C\$) to British pounds (£). To find the latest **rate of exchange**, Trevor checks an online currency converter.

- 1 For every C\$1, Trevor would receive £0.607. How many British pounds (£) will he get for C\$500?

Amount in C\$ \times exchange rate = amount in £

C\$ _____ \times £0.607/C\$ \div £ _____

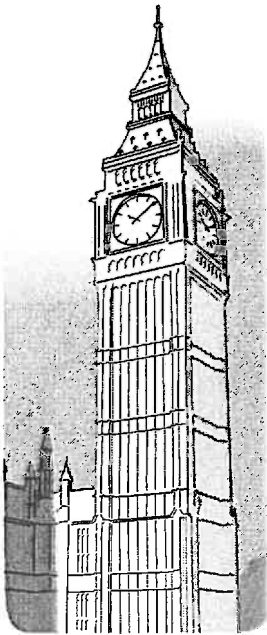
- 2 If Trevor wants to take £500, how much will that cost in Canadian dollars?

C\$ \times £0.607/C\$ \div £500

£500 \div £0.607/C\$ = C\$ _____

Currency exchange rates change every day. Here is a sample.

	Canadian dollar (\$)	US dollar (\$)	Euro (€)	British pound (£)	Japanese yen (¥)	Mexican peso (\$)	Chinese yuan (¥)
Canadian dollar (\$)	1.000	1.035	1.482	1.650	0.011	0.081	0.152
US dollar (\$)	0.967	1.000	1.431	1.594	0.012	0.078	0.146
Euro (€)	0.676	0.699	1.000	1.114	0.008	0.055	0.102
British pound (£)	0.607	0.627	0.898	1.000	0.007	0.049	0.092
Japanese yen (¥)	90.198	93.185	133.388	148.55	1.000	7.303	13.638
Mexican peso (\$)	12.340	12.760	18.265	20.341	0.137	1.000	1.867
Chinese yuan (¥)	6.602	6.833	9.781	10.893	0.073	0.536	1.000



Hint

To use the currency chart, find the column for the currency you're starting with. Then go down that column to find the exchange rate for the currency you want to convert to.

Example 1

Danielle wants to travel to buy textiles. She has \$2000 Canadian. What is that amount worth in Chinese yuan (¥), Japanese yen (¥), and euros (€)?

Hint

You may use the exchange rates from the chart or look up current exchange rates.

Solution

A. What is C\$2000 worth in Chinese yuan (CN¥)?

$$\text{C}\$1 \div \text{¥} \underline{\hspace{2cm}}$$

$$\text{C}\$2000 \times \text{¥} \underline{\hspace{2cm}} / \text{C}\$ \div \text{CN¥} \underline{\hspace{2cm}}$$

B. What is C\$2000 worth in Japanese yen (JP¥)?

$$\text{C}\$2000 \times \text{¥} \underline{\hspace{2cm}} / \text{C}\$ \div \text{JP¥} \underline{\hspace{2cm}}$$

C. What is C\$2000 worth in euros?

$$\text{C}\$2000 \times \text{€} \underline{\hspace{2cm}} / \text{C}\$ \div \text{€} \underline{\hspace{2cm}}$$

REFLECTING

Why would it be important to know the exchange rate of the country you are travelling to before you get there?

Example 2

Danielle has €420 left after travelling to Europe and wants to go to Mexico. What is €420 worth in Mexican pesos (MX\$)?

Solution

$$\text{€}1 \div \text{MX}\$ \underline{\hspace{2cm}}$$

$$\text{€}420 \times \text{MX}\$ \underline{\hspace{2cm}} / \text{€} \div \text{MX}\$ \underline{\hspace{2cm}}$$



Practice

1. Determine the equivalent for each exchange.

Starting currency	Amount	Convert to	Exchange rate	Amount
Canadian dollar	C\$1	US dollars		
Euro	€1	Canadian dollars		
Mexican peso	MX\$1	British pounds		
Japanese yen	JP¥1	Chinese yuan		
US dollar	US\$1	Mexican pesos		
British pound	£1	Japanese yen		
Chinese yuan	CN¥1	Euros		

2. Pierre is going on a work exchange program in Europe. He can fly from Paris, France, to Athens, Greece, for €187. What would his flight cost in Canadian dollars?

3. Determine the equivalent for each exchange.

Starting currency	Amount	Convert to	Exchange rate	Amount
Canadian dollars	C\$300	US dollars		
Euros	€689	Canadian dollars		
Mexican pesos	MX\$35	British pounds		
Japanese yen	JP¥2700	Chinese yuan		
US dollars	US\$25	Mexican pesos		
British pounds	£540	Japanese yen		
Chinese yuan	CN¥99	Euros		

4. Sebastian is shopping in Spain and wonders if a sweater priced at €45 is reasonable compared with a similar \$30 sweater he bought in Nelson, British Columbia. Compare the prices.
5. Amanda is travelling to Haiti to help build a health care clinic. She is taking \$500 Canadian to exchange for Haitian gourdes. How much is C\$500 worth in Haitian gourdes (HTG)?
 $C\$1 \doteq 37.5858$ gourdes (HTG)
6. Tessa is comparing the price of books online. At a Canadian store, one book costs C\$20.49. At an American store, the same book costs US\$18.95. Which price is less?

7. On a trip to California, Tara spent the amounts below. Express these prices in Canadian dollars.

Breakfast US\$12.82 × _____ ÷ C\$ _____

Dinner US\$75.88 × _____ ÷ C\$ _____

Transportation US\$642.25 × _____ ÷ C\$ _____

Clothing US\$120.79 × _____ ÷ C\$ _____

8. Julia bought oranges for €1.99 per kilogram at a market in Germany. She wondered how this compared to the price of oranges in Red Deer, Alberta, at 79¢ per pound.

a) What is the price of €1.99/kg in euros per pound?

b) What is the price in Canadian dollars per pound?

c) Where are the oranges less expensive?

9. Elijah and his family travelled to China. Before they left, they exchanged \$3600 Canadian for Chinese yuan.

a) What is the value of C\$3600 in yuan (CN¥)?

b) While in China, they spent CN¥20 419. They exchanged the remainder back to C\$. What is the value in C\$?

10. Marco is a landscape gardener. He is travelling to learn more about English and Japanese gardens. When he left England, he had £350. What is this worth in Japanese yen?



6.7

Estimating Currency Exchange

Try These

i) $0.5 \times \$2200 = \$$ _____

iii) $1.5 \times \$400 = \$$ _____

ii) $0.1 \times \$4200 = \$$ _____

iv) $2.5 \times \$20 = \$$ _____

Akai needs to create budgets for her business trips. What numbers can she use to estimate without using a calculator?

Hint

To estimate the value of Canadian dollars in yen, multiply by 100.
To estimate an amount in yen in C\$, divide by 100.

- ① Akai is travelling from Canada to Japan. What would be a good estimate for the exchange rate of Canadian dollars to Japanese yen if $C\$1 \div JP¥90.198$?

C\$1 = about JP¥ _____

- ② Akai is travelling from Canada to Scotland. What would be a good estimate for the exchange rate of C\$ to British pounds if $C\$1 \div £0.607$?

C\$1 = about £ _____

Example

Bakana is a flight attendant for a British airline. She has £300. How can she estimate this amount in Canadian dollars?

Solution

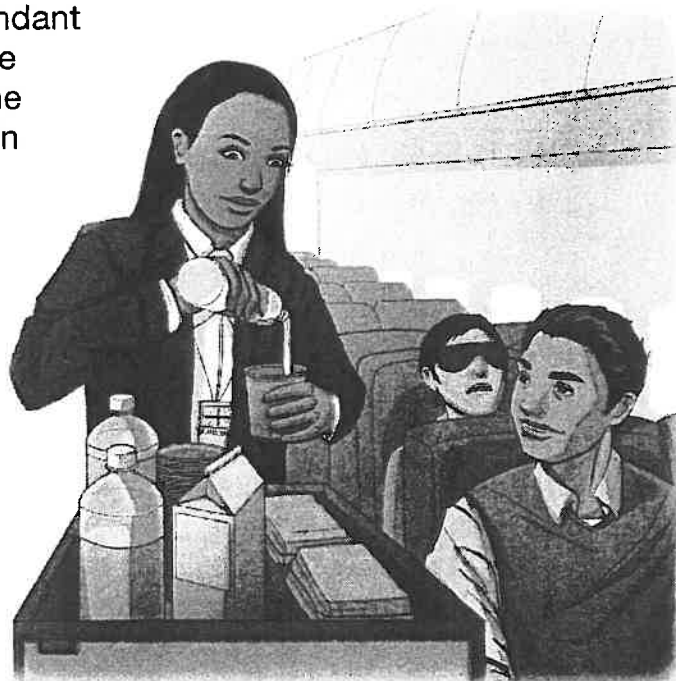
£1 is about C\$ $1\frac{1}{2}$.

So £300 is about

C\$300 + C\$ _____,

which is about

C\$ _____



Hint

You can use mental math when calculating 300×1.5 . Just take half of 300 and add it to 300.

REFLECTING

When might it be useful to estimate an amount in a different currency?

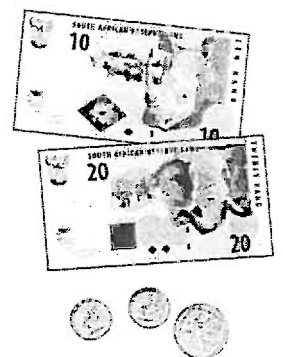
Practice

1. Show a reasonable estimate for each exchange rate.

Starting currency	Amount	Convert to	Exchange rate	Estimate
Canadian dollars	C\$1	South African rand		
Canadian dollars	C\$1	Mexican pesos		
Canadian dollars	C\$1	Euros		
Mexican pesos	MX\$1	Canadian dollars		
Thai baht	1 THB	Canadian dollars		
Chinese yuan	CN¥1	Canadian dollars		

Hint
You may look up current exchange rates online.

2. Hannah is taking a pastry chef program in France. The tuition is €4000. About how much is the tuition in Canadian dollars?
3. Sue would like to place an order for a shipment of shirts for her retail store. The shipment costs about 5000 Mexican pesos. About how much would the shipment be worth in Canadian dollars? Explain how you estimated.
4. Juma rented a car in Australia for \$280 Australian. About how much will this cost in C\$? Explain your estimate.
5. Rosa is ordering goods from South Africa, for 1250 rand. How can you estimate the price in Canadian dollars?



Chapter Review

1. Calculate each unit price.

a) 3 shrubs for \$145.50 c) 200 g for \$69.98

b) \$10.99 for 4 kg d) 250 L for \$362.50

2. Jelani is choosing between a 300 g package of cheddar cheese for \$4.57 and a 450 g package for \$7.65. Which package has a lower unit price?

3. Dalton is trying to attract more members to his gym. Memberships usually cost \$649/year with a sign-up fee of \$75. He offers two promotions:

- Fitness promotion: no sign-up fee
- Strength promotion: 15% off total fee

Which promotion is less expensive for a 12-month membership?

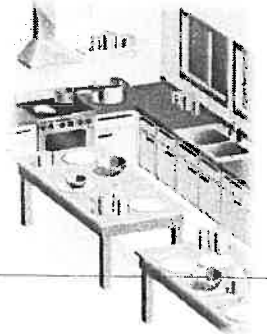
4. Ramona is a travel agent. She has found a 30% off deal for her client. The regular price for the trip is \$850 per person. How much does the trip cost with the 30% discount?

5. Karlee provides maid service to residential homes. She would like to increase her prices by 15%. She currently charges \$18/h.
- a) What would Karlee's new hourly rate be?

- b) Karlee is currently working 40 h a week. How much *more* would she be making after the increase?

6. David wants to take cooking classes. One cooking school offers 12 classes for \$552.50. If he signs up before the end of the week, he will get a 20% discount.

- a) How much will the classes cost with the 20% discount?



-
- b) How much would David be paying per class before the discount and after the discount?

7. In 2010, many people travelled to Vancouver to participate in the Olympics. If an athlete from Japan brought 100 000 yen, how much is this in Canadian dollars if $¥1 \doteq \text{C}\$0.011$?

8. Jonathan travelled to Mexico for business. He paid C\$899 for the trip and spent an additional 1400 pesos while in Mexico.

- a) Estimate the value of MX\$1400 in Canadian dollars.

- b) Calculate the cost of Jonathan's trip in Canadian dollars.

Chapter Test

1. Isoke manages a shoe store. A shipment of 24 pairs costs \$743.52. Before she sells the shoes, she calculates the price per pair and adds 112% to the unit price. How much profit does Isoke make per pair?
2. Trevor has two offers to consider for lift passes for snowboarding at his favourite hill. The regular price for a lift pass is \$87.
 - Jump offer: buy one get another at half off
 - Rail offer: 20% off each pass
 - a) If Trevor wants to buy 10 lift passes, which offer is a better price?
 - b) If Trevor wants to buy 2 lift passes, which offer is a better price?
3. Suppose you had \$500 Canadian. Calculate the amount of money that would be in each currency.
 - a) US dollars
 - b) Euros
 - c) Japanese yen

Hint

You can look up the current exchange rate or use these.

C\$1 = US\$0.967

C\$1 = €0.676

C\$1 = JP¥90.198

Glossary

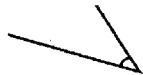
A

acres: a unit of measure for area in the imperial system

1 acre = 4840 sq yd

1 acre \approx 0.405 ha

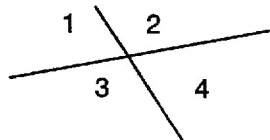
acute angle: an angle that measures more than 0° and less than 90°



adjacent angles: angles that share a common vertex and a common arm

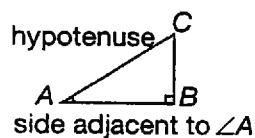
For example, angles 1 and 2 are adjacent angles.

Angles 3 and 4 are adjacent angles.



adjacent side: the side that is part of an acute angle in a right triangle but is not the hypotenuse

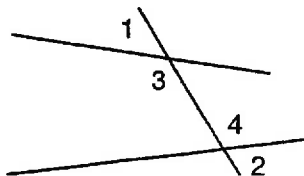
For example, AB is adjacent to $\angle A$.



adjacent sides: two sides in a triangle or polygon that share a vertex

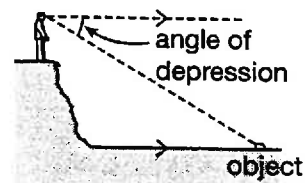
alternate angles: two angles formed by two lines and a transversal and located on opposite sides of the transversal

For example, angles 3 and 4 are alternate interior angles. Angles 1 and 2 are alternate exterior angles.

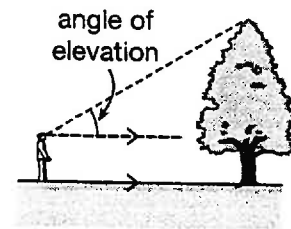


angle bisector: a line that cuts an angle in half to form two equal angles

angle of depression: the angle between the horizontal and the line of sight when looking down at an object



angle of elevation: the angle between the horizontal and the line of sight when looking up at an object



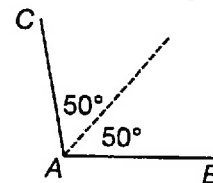
annual: for a year

B

base salary: payment for a given work period, such as an hour or a week, but not including additional pay

bisect: to divide into two equal parts

bisector: the line that divides an angle or line into two equal parts



bonus: an additional payment to a worker as a reward for meeting company goals

C

Canada Pension Plan (CPP): a government fund that provides a monthly pension to workers when they retire

capacity: the amount that a container can hold

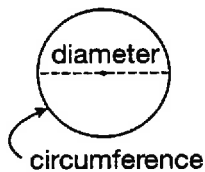
Celsius: a scale for temperature that includes the freezing point of water at 0° and the boiling point of water at 100°

centimetre (cm): a unit of measure for length in the metric system
 $1 \text{ cm} = 10 \text{ mm}$
 $100 \text{ cm} = 1 \text{ m}$

centre of rotation: a fixed point around which points in a shape are rotated. It can be inside or outside the shape.

charitable donations: an option for employees to make a regular donation to a charity

circumference: the perimeter of a circle
 $\text{Circumference} = \pi \times d$, where d is the **diameter** (π is about 3.14)



commission: a payment based on a percentage of the worker's sales

company health plan: a plan for medical expenses not covered by other government health care plans

company pension plan: a fund that provides a company pension during retirement, in addition to **CPP**

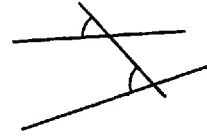
complementary angles: two angles whose sum is 90°

congruent: same size and shape

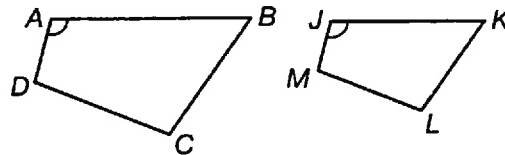
contract: a payment for a fixed period of time and/or a fixed amount of money

coordinates (x, y): a way to describe locations on a grid using a pair of numbers
For example, $(-1, 3)$ lines up with -1 on the x -axis and 3 on the y -axis.

corresponding angles: 1. two angles formed by two lines and a transversal and located on the same side of the transversal

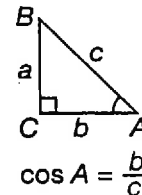


2. angles that match when two shapes are arranged to look the same



corresponding sides: sides that match when two shapes are arranged to look the same
For example, AB and JK are corresponding sides (above).

cosine: the ratio of the length of the **adjacent leg** to the length of the **hypotenuse** in a **right triangle**



cup (c): a unit of measure for **capacity** in the imperial system

$1 \text{ cup} = 8 \text{ fluid ounces (US) or } 10 \text{ fluid ounces (UK)}$

$2 \text{ cups} = 1 \text{ pint}$

D

decametre (dam): a unit of measure for length in the metric system

$1 \text{ dam} = 10 \text{ m}$

$100 \text{ dam} = 1 \text{ km}$

decimetre (dm): a unit of measure for length in the metric system

$1 \text{ dm} = 10 \text{ cm}$

$10 \text{ dm} = 1 \text{ m}$

diameter: a straight line through the centre of a circle that joins two points on the **circumference**

$\text{Diameter} = \text{radius} \times 2$

dilation: the result of multiplying or dividing each length on a shape by the same number to create a similar shape

dilation centre: a fixed point from which a shape is enlarged or reduced

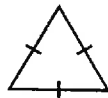
disability insurance: a plan that provides a source of income when an employee is injured and unable to work

double time: the hourly wage multiplied by 2

E

Employment Insurance (EI): a fund that provides income to people who lose their jobs (through no fault of their own) while they look for a new job

equilateral triangle: an equilateral triangle has equal sides and equal angles



F

face: a 2-D shape that forms a flat surface of a 3-D object

Fahrenheit: a scale for temperature that includes the freezing point of water at 32° and the boiling point of water at 212°

fluid ounce (fl oz): a unit of measure for **capacity** in the imperial system
1 fluid ounce = 2 tablespoons
8 fluid ounces = 1 cup (US) or
10 fluid ounces = 1 cup (UK)

foot (ft): an imperial unit of measurement for length
1 foot = 12 inches
3 feet = 1 yard

G

gallon (gal): a unit of measure for **capacity** in the imperial system
1 gallon = 4 quarts

gram (g): a unit of measure for **mass** in the metric system
1000 g = 1 kg

gross income: the total amount of money earned in a pay period before any deductions

H

hectares (ha): a unit of measure for area in the metric system
1 ha is the same area as 1 square hectometre
1 ha = 1 hm²

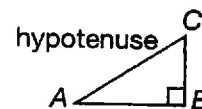
hectometre (hm): a unit of linear measure in the metric system
1 hm = 100 m
10 hm = 1 km

height: the perpendicular distance from the base of a **polygon** to an opposite vertex



hourly wage: a fixed payment for each hour of work

hypotenuse: the side of a **right triangle** that is opposite the 90° angle



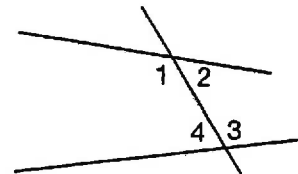
I

inch: an imperial unit of measurement for length
12 inches = 1 foot
36 inches = 1 yard

income: money received for work

income tax: a portion of a worker's earnings that federal and provincial governments use to provide services

interior angles: 1. angles inside a polygon
2. angles between two lines
For example,



irregular polygon: a closed figure with straight sides with varying side lengths and angle measures

K

kilogram (kg): a metric unit of measure for **mass**

1 kg = 1000 g

1000 kg = 1 tonne (t)

kilolitre (kL): a unit of measure for **capacity** in the metric system

1 kL = 1000 L

kilometre (km): a unit of measure for length in the metric system

1 km = 1000 m

L

legs: the two sides that form the 90° angle in a **right triangle** (see **hypotenuse**)

life insurance: a plan that pays a sum of money to a family member or designated beneficiary in the case of an employee's death

line of reflection: the line across which a shape is flipped

litre (L): a metric unit of measure for **capacity**

1 L = 1000 mL

1000 L = 1 kL

M

mass: the amount of matter in an object. Common units of mass are **grams**, **kilograms**, and **tonnes** (metric) and **pounds** and **tons** (imperial).

metre (m): the base unit of measure for length in the metric system

1 m = 100 cm

1000 m = 1 km

midpoint: the point on a line segment that divides it into two equal parts

mile (mi): an imperial unit of measure for length

1760 yards = 1 mile

5280 feet = 1 mile

millilitre (mL): a metric unit of measure for **capacity**

1000 mL = 1 L

millimetre (mm): a unit of measure for length in the metric system

1000 mm = 1 m

10 mm = 1 cm

N

net: a composite 2-D shape that can be folded to create a 3-D object (such as a cube, cone, pyramid, cylinder)

net income: the money left after deductions are taken from gross income; also called take-home pay

O

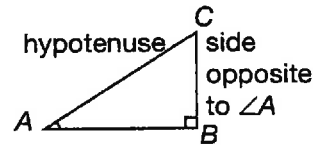
obtuse angle: an obtuse angle is greater than 90° but less than 180°



opposite angles: non-adjacent angles that are formed by two intersecting lines



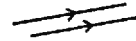
opposite side: the side that is directly across from a specific **acute angle** in a **right triangle**. For example, BC is opposite $\angle A$.



ounce (oz): a unit of measure for **mass** in the imperial system
16 ounces = 1 pound

P

parallel: two or more lines that are always the same distance apart



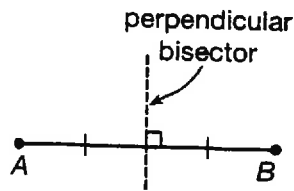
payroll savings: an option for employees to make a regular contribution to a savings plan, such as Canada Savings Bonds

perimeter: the distance around an object

perpendicular: two lines that form a right angle (90°)



perpendicular bisector: a line that bisects a line segment and is perpendicular to the line segment



pi (π): the ratio of the **circumference** of a circle to its **diameter**. Its value is about 3.14.

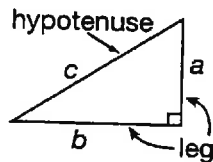
piecework: a payment based on the number of items created or completed

pint (pt): a unit of measure for **capacity** in the imperial system
 1 pint = 2 cups
 2 pints = 1 quart

polygon: a closed figure with straight sides

pound (lb): a unit of measure for **mass** in the imperial system
 1 pound = 16 ounces
 2000 pounds = 1 ton

Pythagorean theorem: a statement of a relationship in which the sum of the squares of the lengths of the **legs** of a **right triangle** is equal to the square of the length of the **hypotenuse**
 $a^2 + b^2 = c^2$

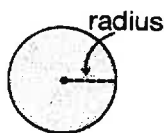


Q

quart (qt): a unit of measure for **capacity** in the imperial system
 1 quart = 2 pints
 4 quarts = 1 gallon

R

radius: a straight line from the centre of a circle to any point on the **circumference**



rate of exchange: the amount that money is worth from one currency to another. This varies daily.

ratio: a comparison of quantities with the same units

reciprocal: the multiplier of a number that gives 1 as a result

For example, the reciprocal of $\frac{1}{2}$ is $\frac{2}{1}$ or 2.

$$\frac{1}{2} \times \frac{2}{1} = 1 \text{ and}$$

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

referent: a known measure used for comparing and estimating

reflection: the result of flipping a 2-D shape across a line

reflex angle: an angle that measures between 180° and 360°



regular polygon: a closed figure with all sides equal and all angles equal

right angle: an angle that measures 90°

right triangle: a triangle that contains a right angle

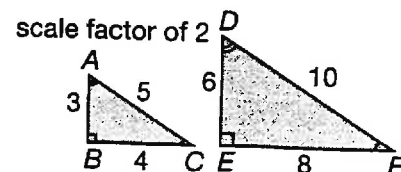
rotation: the result of turning a 2-D shape around a point. Rotations can go clockwise (cw) or counterclockwise (ccw).

royalty: a payment for a piece of work that is marketed and sold. The amount is based on a percentage of sales.

S

salary: a regular fixed payment for work, usually expressed as an amount per year but paid regularly (e.g., every two weeks or monthly)

scale factor: the number that the dimensions of a **polygon** are multiplied by to calculate the corresponding dimensions of a **similar polygon**

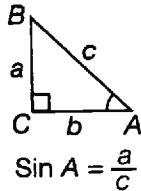


sectors: sections of a circle

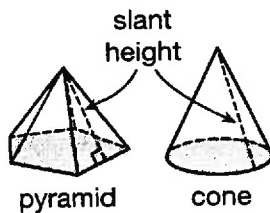
shift premium: an additional amount of money for working outside of regular workday hours or on weekends

similar polygons: polygons that are congruent or are enlargements or reductions of each other. The ratios of corresponding lengths are the same, and corresponding angles are equal.

sine: the ratio of the length of the **opposite** leg to the length of the **hypotenuse** in a **right triangle**



slant height: the distance from the top to the base, at a right angle, along a slanted side of a pyramid or cone. It is measured to the **midpoint** of the base side for a pyramid.



square number: the result when a whole number is multiplied by itself

straight commission: payment based only on sales made

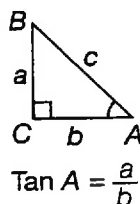
supplementary angles: two angles whose sum is 180°

surface area: the sum of all the areas of the faces of a 3-D object

symmetrical: a way of describing a shape that can be folded along at least one line so one half fits exactly over the other

T

tangent: the ratio of the length of the **opposite** leg to the length of the **adjacent** leg



time and a half: the hourly wage multiplied by a factor of 1.5

ton (T): a unit of measure for **mass** in the imperial system
1 ton = 2000 pounds

tonne (t): a metric unit of measure for **mass**
1 t = 1000 kg

transformation: the result of moving or changing a shape according to a rule. The new shape is called the image.

translation: the result of sliding a 2-D shape along a straight line. On a grid, you can translate a shape right, left, up, or down.

translation rule: a way of describing a translation with numbers and directions
For example, "8 units right and 4 units up" or (R8, U4)

transversal: a line that intersects two or more lines

trigonometry: the study of relationships among the sides and angles in **right triangles**

U

union dues: a deduction made when an employee belongs to a union. Unions negotiate wages, benefits, and working conditions with employers.

unit price: the amount of money charged for a unit of an item

V

vertex: the point where two or more lines meet

volume: the amount of space occupied by a 3-D object

W

wage and tips: an hourly wage plus varying amounts in tips for services provided

Y

yard: an imperial unit of measure for length
1 yard = 3 feet
1 yard = 36 inches

Charts and Formulas

Metric Units

Length	Area	Volume	Capacity	Mass
kilometre (km) 1 km = 1000 m	square kilometre (km ²) 1 km ² = 1 000 000 m ² 1 km ² = 100 ha	cubic kilometre (km ³) 1 km ³ = 1 000 000 000 m ³	kilolitre (kL) 1 kL = 1000 L	kilogram (kg) 1 kg = 1000 g 1000 kg = 1 t
hectometre (hm) 1 hm = 100 m	square hectometre (hm ²) 1 hectare (ha) = 1 hm ² 1 ha = 10 000 m ²	cubic hectometre (hm ³) 1 hm ³ = 1 000 000 m ³	hectolitre (hL) 1 hL = 100 L	hectogram (hg) 1 hg = 100 g
decametre (dam) 1 dam = 10 m	square decametre (dam ²) 1 dam ² = 100 m ²	cubic decametre (dam ³) 1 dam ³ = 1000 m ³	decalitre (daL) 1 daL = 10 L	decagram (dag) 1 dag = 10 g
metre (m) 1 m = 100 cm	square metre (m ²) 1 m ² = 10 000 cm ²	cubic metre (m ³) 1 m ³ = 1 000 000 cm ³	litre (L) 1 L = 1000 mL	gram (g) 1 g = 1000 mg
decimetre (dm) 1 dm = 0.1 m	square decimetre (dm ²) 1 dm ² = 0.01 m ²	cubic decimetre (dm ³) 1 dm ³ = 0.001 m ³	decilitre (dL) 1 dL = 0.1 L	decigram (dg) 1 dg = 0.1 g
centimetre (cm) 1 cm = 0.01 m 1 cm = 10 mm	square centimetre (cm ²) 1 cm ² = 0.0001 m ²	cubic centimetre (cm ³) 1 cm ³ = 0.000 001 m ³ Note: 1 cm ³ holds 1 mL	centilitre (cL) 1 cL = 0.01 L	centigram (cg) 1 cg = 0.01 g
millimetre (mm) 1 mm = 0.001 m	square millimetre (mm ²) 1 mm ² = 0.000 001 m ²	cubic millimetre (mm ³) 1 mm ³ = 0.000 000 001 m ³	millilitre (mL) 1 mL = 0.001 L	milligram (mg) 1 mg = 0.001 g

Imperial Units

Length	Area	Volume	Capacity	Mass
inch (in. or ")	square inches (sq in.)	cubic inches (cu in.)	tablespoon (T)	ounces (oz)
foot (ft or ') 1 foot = 12 inches	square feet (sq ft) 1 sq ft = 144 sq in.	cubic feet (cu ft) 1 cu ft = 1728 cu in.	fluid ounce (fl oz) 1 fl oz = 2 T	pound (lb) 1 lb = 16 oz
yard (yd) 1 yard = 3 feet	square yard (sq yd) 1 sq yd = 9 sq ft	cubic yard (cu yd) 1 cu yd = 27 cu ft	cup (c) 1 c = 8 fl oz (US) 1 c = 10 fl oz (UK)	ton (T) 1 T = 2000 lb (US) 1 T = 2240 lb (UK)
mile (mi) 1 mile = 1760 yd	square mile (sq mi) 1 sq mi = 3 097 600 sq yd 1 acre = 4840 sq yd	cubic mile (cu mi)	pint (pt) 1 pt = 2 c	
			quart (qt) 1 qt = 2 pt	
			gallon (gal) 1 gal = 4 qt	

Converting Common Imperial Units to Metric (SI)

Linear	Area	Volume	Capacity	Mass
1 in. = 2.54 cm	1 sq in. = 6.4516 cm ²	1 cu in. = 16.39 cm ³	1 fl oz = 29.57 mL	1 oz = 28.35 g
1 ft = 0.31 m	1 sq ft = 0.0929 m ²	1 cu ft = 28.32 dm ³	1 pt = 0.47 L, or 470 mL	1 lb = 0.45 kg
1 yd = 0.91 m	1 sq yd = 0.8361 m ²	1 cu yd = 0.76 m ³	1 qt = 0.95 L, or 950 mL	1 T = 0.91 t
1 mi = 1.61 km	1 sq mi = 2.5900 km ² 1 acre = 0.4047 ha	1 cu mi = 4.17 km ³	1 gal = 3.79 L, or 3790 mL	

Converting Common Metric (SI) Units to Imperial

Linear	Area	Volume	Capacity	Mass
1 mm = 0.039 in.			1 mL = 0.03 fl oz	
1 cm = 0.39 in.	1 cm ² = 0.1550 sq in.	1 cm ³ = 0.06 cu in.		
1 m = 1.09 yd	1 m ² = 10.7639 sq ft	1 m ³ = 1.31 cu yd	1 L = 2.11 pt	1 g = 0.04 oz
1 m = 3.27 ft			1 L = 1.06 qt	1 kg = 2.21 lb
1 km = 0.62 mi	1 km ² = 0.3861 sq mi	1 km ³ = 0.24 cu mi	1 L = 0.26 gal	1 t = 1.10 T

Temperature

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

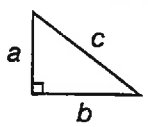
$$C = \frac{5}{9}(F - 32)$$

Circle Formulas

Diameter = radius \times 2
 Circumference = $\pi \times$ diameter
 Circumference = $\pi \times$ radius \times 2
 Area: $\pi \times r^2$

Pythagorean theorem

$a^2 + b^2 = c^2$, where a and b are sides adjacent to the right angle in a right triangle and c is the hypotenuse



Primary Trigonometric Relationships

$$\sin A^\circ = \frac{\text{opposite side of } A^\circ}{\text{hypotenuse}}$$

$$\cos A^\circ = \frac{\text{adjacent side of } A^\circ}{\text{hypotenuse}}$$

$$\tan A^\circ = \frac{\text{opposite side of } A^\circ}{\text{adjacent side of } A^\circ}$$

