

## 2.8

# Solving Percent Problems Using Decimals

You will need

- a calculator

► **GOAL**

Use percents to solve problems that involve everyday situations.

## Learn about the Math

Miranda wants to buy an MP3 player. In a newspaper, she sees an MP3 player that regularly sells for \$119.95 advertised at 20% off. She would also have to pay 15% in taxes. She has saved \$115.00 from babysitting.



? **Does Miranda have enough money to buy the MP3 player?**

### Example 1: Working with discounts and sales tax

How much does Miranda need to buy the MP3 player? Does she have enough?

#### Eva's Solution

$$\begin{aligned} \text{discount} &= 20\% \text{ of } \$119.95 \\ &= 0.2 \times \$119.95 \\ &= \$23.99 \end{aligned}$$

The discount is 20% of \$119.95. I converted the percent discount to a decimal.

I calculated the discount by multiplying the regular price by the discount expressed as a decimal.

$$\begin{aligned} \text{sale price} &= \text{regular price} - \text{discount} \\ &= \$119.95 - \$23.99 \\ &= \$95.96 \end{aligned}$$

I calculated the sale price by subtracting the discount from the regular price.

$$\begin{aligned} \text{taxes} &= 15\% \text{ of sale price} \\ &= 0.15 \times \$95.96 \\ &= \$14.39 \end{aligned}$$

I calculated the taxes by multiplying the sale price by the tax rate. I changed 15% to 0.15 and rounded my answer to the nearest cent.

$$\begin{aligned} \text{purchase price} &= \text{sale price} + \text{taxes} \\ &= \$95.96 + \$14.39 \\ &= \$110.35 \end{aligned}$$

I determined the purchase price by adding the taxes to the sale price.

Miranda will spend \$110.35.

The purchase price is less than Miranda's savings, so she has enough money to buy the MP3 player.



## Reflecting

1. How do you know that calculating 80% of the regular price gives you the same result as subtracting 20% from the regular price?
2. How do you know that multiplying the sale price by 1.15 gives the purchase price?
3. How do you know that calculating  $\$119.95 \times 0.8 \times 1.15$  gives the correct purchase price?

## Work with the Math

### Example 2: Calculating interest

Raul took out a loan to buy a computer. The computer cost \$1299.00. The interest rate on the loan is 8.25% each year. Calculate the amount of interest Raul will pay back over the two years.

#### Solution

$$\begin{aligned}\text{yearly interest} &= \text{amount of loan} \times \text{annual interest rate} \\ &= \$1299.00 \times 8.25\% \\ &= \$1299.00 \times 0.0825 \\ &= \$107.1675\end{aligned}$$

$$\begin{aligned}\text{total interest} &= \text{yearly interest} \times \text{length of loan in years} \\ &= \$107.1675 \times 2 \\ &= \$214.335\end{aligned}$$

Raul will pay \$214.34 in interest.

### A Checking

4. A television is on sale for 25% off the regular price of \$339.95. Calculate the discount and the purchase price if the taxes are 15%.

### B Practising

5. Mikael's father bought a new car for \$35 500. The car decreased in value by 20% after one year. What was the value of the car after one year?

6. a) Calculate the 8% Ontario provincial sales tax (PST) and the 7% goods and services tax (GST) for each item.



- b) Calculate the purchase price for each item in part (a).

7. a) Calculate the discount and the sale price for each item.



- b) Calculate the purchase price for each item in part (a). All the items were purchased in Alberta (0% PST and 7% GST).
8. Lawrence added the taxes to the price of an item before taking off the discount. Tina took off the discount and then added the taxes. Will they get the same purchase price? Explain why or why not.
9. Calculate the simple interest on each amount and the total amount at the end.
- a loan of \$250 at 5% per year over three years
  - a deposit of \$500 that pays 3.5% per year over five years
  - a loan of \$1200 at 6.9% per year over four years
  - a deposit of \$2550 that earns 3% interest over 30 months
  - a loan of \$5000 at 8% per year over 39 weeks
10. Miriam wants to buy a pair of inline skates. One store is selling the skates Miriam wants at 15% off the regular price of \$149.95. Another store is selling the skates for \$139.95, with 10% off. Which store has the better price?

11. An electronics store offers its customers the choice of two payment plans to finance their stereo purchases. A customer makes a down payment and pays the remaining amount over time.

- Plan A: financing the remaining amount at 8% per year, simple interest, for 2 years
- Plan B: financing the remaining amount at 4% per year, simple interest, for 5 years

Stefan wants to buy a stereo system that sells for \$459.95 including taxes. Which plan should he choose to pay the least amount of money if he makes a down payment of \$100 today?

## C Extending

12. Jude bought a T-shirt during a store's annual super sale. The regular price of the T-shirt was \$25.99, but it was on sale at 20% off. Because of the super sale, Jude received an additional 10% off the sale price. Calculate the purchase price of the T-shirt, including 15% tax.
13. Terry has a savings account that pays 1.9% interest per year. Terry's grandmother opened the account for him on his 10th birthday and deposited \$500. How much will Terry have in the account on his 14th birthday if no other deposits or withdrawals are made? Interest earned each year is added to the account at the end of the year.
14. Charlene's bank account pays 1.5% interest each year. Charlene currently has \$450 in the account. She is planning to deposit \$50 three months from now and \$200 six months from now. What will her account balance be one year from now?
15. Nalini is a real estate agent. She is paid 2.9% commission on the sale of a home. If she sells a home for \$259 000, what will her commission be?