Chapter 3
Lesson 8

Subtracting Decimals by Renaming

GOAL

Rename decimals to make subtraction easier.

Curt Harnett was the first Canadian cyclist to win three Olympic medals. In 1996, he became the first person to cycle 200 m in less than 10 seconds when he set a world record of 9.865 seconds.

How much less than 10 seconds is Curt Harnett's world record time?

Justine's Solution

I estimate that his time is about 0.1 seconds less than 10 seconds.

- **Step 1** I need to calculate 10 − 9.865. I'll rename 10.000 as 9.999 + 0.001 so it's easier to subtract.

9.999 + 0.001
~~10.000~~
− 9.865

- **Step 2** Now I'll subtract.

9.999 + 0.001
~~10.000~~
− 9.865
0.134 + 0.001 = 0.135

Curt Harnett's time is 0.135 seconds less than 10 seconds.

Reflecting

A. Why do you think Justine added 0.001 to 0.134 in Step 2?

B. Use regrouping to subtract 9.865 from 10. Is Justine's strategy of renaming 10 more efficient? Explain.

Checking

1. In 1960, in Saskatoon, Harry Jerome set a world record of 10 seconds for the 100 m sprint. In 2007, the world record was 9.77 seconds. How many seconds less than Harry Jerome's time is this time?

Practising

2. Barrett bought 2.635 kg from a 5 kg block of cheese.

a) How many kilograms of cheese are left?

b) How do you know your answer is reasonable?

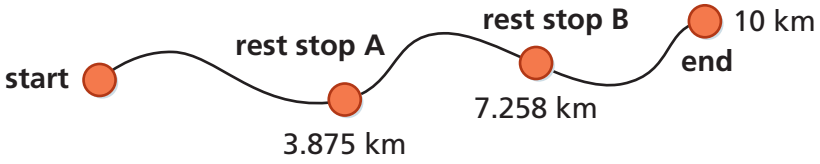
3. Star sometimes subtracts two whole numbers by adding the same amount to both numbers.

$$1000 - 198 = \overset{+2}{\overbrace{1002}} - \overset{+2}{\overbrace{200}} \qquad 1000 - 198 = 802$$

a) Explain how Star's method works. Draw a picture to help you explain.

b) Calculate $10 - 1.998$ using Star's method.

4. Emily is riding her mountain bike along a trail.



a) She stops to have a drink at rest stop A. How much farther does Emily have to ride to complete the trail?

b) How do you know your answer is reasonable?

c) How far is rest stop B from the end of the trail?

5. Estimate, and then calculate. Show your work.

a) $5 - 1.789$

b) $10 - 6.58$

c) $2 - 0.728$

d) $40 - 18.77$

e) $13 - 4.789$

f) $8 - 3.79$

6. **a)** Show two ways to calculate $10 - 7.98$.

b) Which way would you rather use? Why?

7. What number is missing in each equation?

a) $7.75 + a = 10$

b) $5 - 2.777 = b$

8. Estimate to place the decimal point in each difference. Show your work for one answer.

a) $5 - 2.778 = 2222$

b) $3 - 0.786 = 2214$

9. Jack subtracted 0.437 from 3 by renaming 3 as $2.997 + 0.003$.

$$\begin{array}{r} 2.997 + 0.003 \\ \cancel{3.000} \\ -\ 0.437 \\ \hline 2.560 \end{array}$$

a) What step is missing?

b) What is another way that Jack could rename 3.000 before subtracting 0.437?