

Chapter 3
Lesson 3

Estimating Decimal Sums and Differences

You will need

- thousandths grids
- pencil crayons

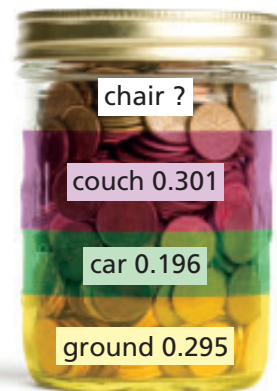


GOAL

Estimate sums and differences with decimals.

Norman Foote's song "1000 Pennies" is about finding pennies on the ground, in a car, on a couch, and on an easy chair. The singer is from Vancouver.

In a jar of 1000 pennies, each penny is 1 thousandth or 0.001 of the total amount. Each decimal on the jar represents the portion of pennies found in each place.



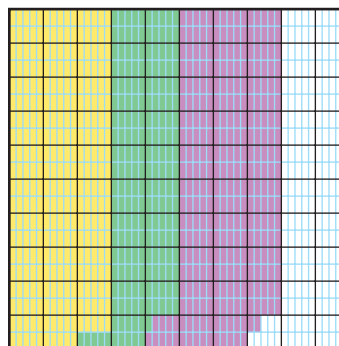
How can you estimate the decimal for the portion of pennies found on the easy chair?



Owen's Solution

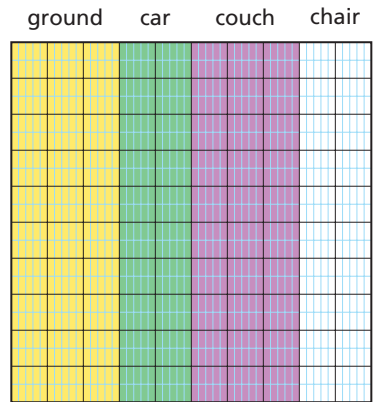
Each rectangle in the thousandths grid represents 1 thousandth, or 0.001, of the pennies in the jar. The sum of the four decimals for the four locations is 1000 thousandths or 1.000.

ground	car	couch	chair
0.295	0.196	0.301	?



To estimate the sum of the three known decimals, I'll add close, but easier, numbers.

$$\begin{array}{r}
 0.295 \quad 300 \text{ thousandths} \\
 0.196 \quad 200 \text{ thousandths} \\
 + 0.301 \quad + 300 \text{ thousandths} \\
 \hline
 \quad \quad \quad 800 \text{ thousandths}
 \end{array}$$



The sum of the three known decimals is about 0.800.

So, about 200 thousandths, or 0.200, of the pennies were found on the easy chair.

Reflecting

- A. How did Owen use the fact that the sum of the three known decimals is about 0.800 to figure out that 0.200 of the pennies were found on the easy chair?
- B. What is another way to estimate the portion of pennies found on the easy chair?



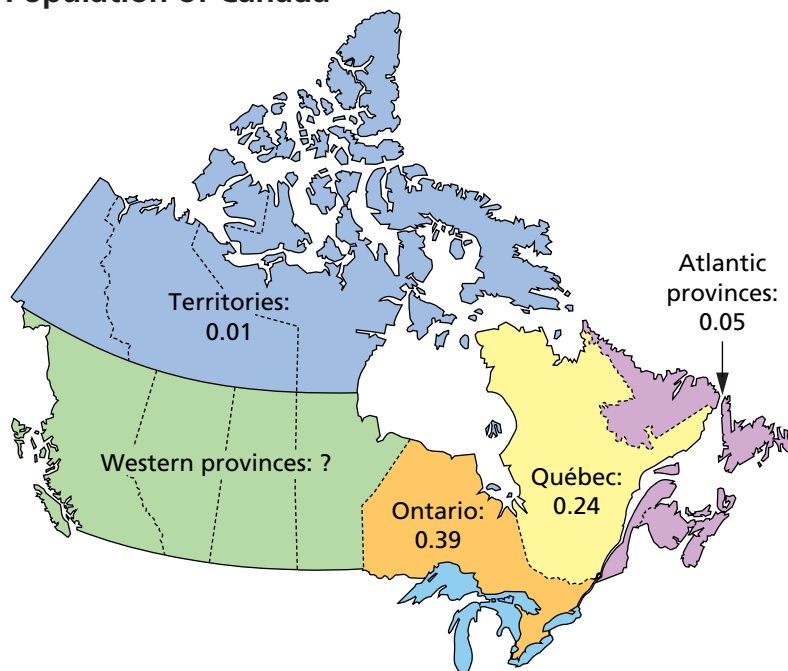
Checking

1. This jar also contains 1000 pennies. Each penny represents 0.001 of the pennies in the jar.
 - a) Estimate the sum of the three decimals given. Explain what you did.
 - b) Use your answer for part a) to estimate the portion of pennies found on the couch.

Practising

2. The map below shows the portion of the Canadian population that lives in each region, except the Western provinces. Ken calculated that 0.31 of the population lives in the Western provinces. Estimate to check whether his answer is reasonable.

Population of Canada



3. Estimate to select the correct answer for each calculation.
- a) $2.77 + 6.29 = \blacksquare$ 9.06 or 10.06
 - b) $0.699 + 0.319 = \blacksquare$ 1.018 or 1.218
 - c) $2 - 0.499 = \blacksquare$ 0.501 or 1.501
 - d) $23.698 - 9.777 = \blacksquare$ 12.921 or 13.921
4. Estimate the missing number in each equation. Explain your reasoning for two of your answers.
- a) $10.00 - 6.35 = s$
 - b) $8.68 + a = 11.00$
 - c) $1.000 - 0.789 = r$
 - d) $2.53 + 3.98 + 2.46 = n$
 - e) $5.123 - t = 4.975$
 - f) $q - 7.14 = 3.678$

5. Ella has two lengths of outer-space border to go 14.00 m around her four bedroom walls. One length is 5.65 m and the other length is 7.45 m. Ella wonders whether she has enough border. Should Ella's estimate be less than or greater than the actual amount needed? What numbers could she use to estimate? Explain.



6. Make up your own problem like Question 5, in which someone has to decide whether to estimate high or low. Give your problem to a classmate to solve.
7. Sophie estimated that the sum of two decimals is close to 10. If both decimals have three decimal places, what might the two decimals be? Explain your thinking.
8. Aaron is marking off cross-country ski trails. One trail is between 0.250 and 0.750 km longer than the other. What could the lengths of the two trails be? List three possibilities.
9. Eldon subtracted 6.53 from 10.00. He did the calculation again to check and got the same answer.

$$\begin{array}{r} 10.00 \\ - 6.53 \\ \hline 4.53 \end{array}$$

- a) Is Eldon's answer reasonable? How do you know?
- b) Why should Eldon have estimated to check his answer rather than doing the same calculation again?