Addition and Subtraction

Goals

You will be able to

• add and subtract mentally
• estimate sums and differences
• use addition and subtraction to solve one-step and two-step problems
• add and subtract four-digit whole numbers and decimals
• calculate the total cost of purchases and the amount of change
CHAPTER 4

Getting Started

Going to the Movies

You enter a contest and win these movie gift certificates.

You want to use them to take some adults, some classmates, and yourself to a movie.

What group of people can you take to a movie?

You will need
• a calculator
• movie gift certificates

? What group of people can you take to a movie?
A. Use estimation to decide on a group of people you can take to a movie. Show your work.

B. Calculate the cost of taking that group to a movie.

C. Did you use mental math, pencil and paper, or a calculator to calculate the cost of taking your group to a movie? Explain your choice.

D. Compare your answer to Part B to your estimate in Part A. Is your answer reasonable?

E. What combination of gift certificates can you use? Explain how you decided on that combination.

F. What change would you get if you used the gift certificates from Part E?

G. Create and solve a problem about taking some adults and some classmates to two movies.

**Do You Remember?**

1. The population of a town is just over 6000. The number of children living in the town is 767. About how many adults live in the town? Explain how you estimated.

2. Show two ways to subtract 775 from 1000.

3. Estimate and then calculate. Show your work.
   a) \(4566 + 1837 = \)  
   c) \(3000 - 865 = \)
   b) \(2756 + 4248 = \)  
   d) \(3299 + \) 6348

4. Use mental math.
   a) \(75 + 26\)  
   b) \(15 + 69\)  
   c) \(100 - 15\)  
   d) \(80 - 18\)
Adding and Subtracting Using Mental Math

**Goal**

Use mental math strategies to add and subtract.

The CN Tower has 1769 steps that the public may climb. Aaron set a goal to climb 1000 of the steps.

**How many more steps do you have to climb after each rest to reach a goal of 1000 steps?**

A. Use mental math to calculate the number of steps Aaron has left to climb after rest 1. Describe your strategy.

B. Use mental math to calculate the number of steps Aaron has left to climb after rest 2. Describe your strategy.

C. Climbing stairs is tiring. After rest 2, Aaron climbs fewer steps between rests. How many steps might he climb between the remaining rests?

D. Use your numbers from Part C to calculate the number of steps Aaron has left to climb after rests 3 and 4.

E. Aaron will reach his goal with five rests. Describe how you would reach the same goal with five rests. How many steps would you have left to climb after each rest?

**Reflecting**

1. Compare your mental math strategy for Part B to the strategies of your classmates.

2. Did the numbers you chose for Part E allow you to use mental math? Explain why or why not.
Open Sentences

An open sentence or equation contains one or more symbols that represent numbers. The sentence may always, sometimes, or never be true when numbers replace the symbols.

1. If the missing number is a whole number, is each open sentence always true, sometimes true, or never true? Give a reason for each answer.
   a) \(222 + \_ = 227\)
   b) \(25 + \_ = \_ + 25\)
   c) \(100 > 105 + \_\)
   d) \(123 - \_ < 200\)

2. Explain why the open sentence \(\_ - 99 = \_ - 100 + 1\) is always true.

3. (a) Write an open sentence that is always true.
   (b) Write an open sentence that is never true.
   (c) Write an open sentence that is true for only one value of the missing number.

Liam’s Open Sentence

I’ll work with this sentence.

\(5 + \_ > 12\)

I replace \(\_\) with 8.

\(5 + 8 > 12\) true

I replace \(\_\) with 2.

\(5 + 2 > 12\) not true

The open sentence \(5 + \_ > 12\) is sometimes true.
Estimating Sums and Differences

Monique’s ringette coach is comparing the number of ringette players in different provinces. She knows there are 2475 players in Quebec. The chart shows data for Ontario players.

How many more ringette players are there in Ontario than in Quebec?

The coach used a calculator to figure out the total number of players in Ontario. Some team members thought the calculation was unreasonable.

Monique’s Estimate

I round each number down to a lower thousand and calculate the total.

\[1000 + 1000 + 1000 + 1000 = 4000\]

I round each number up to the next thousand and calculate the total.


I estimate that the total is between 4000 and 8000.

I can justify this estimation strategy. It gives me a range for the total, and I only have to add digits in the thousands place.

Akiko’s Estimate

I estimate that the total is about 5600.

Jasleen’s Estimate

I estimate that the total is about 5000.

A. What strategies might Akiko and Jasleen have used to estimate?
B. Calculate the total number of players in Ontario.

C. Estimate how many more ringette players there are in Ontario than in Quebec. Show your work.

D. Calculate how many more ringette players there are in Ontario than in Quebec.

E. Compare your calculated answer to your estimate. Is your answer reasonable? Explain.

**Reflecting**

1. a) Are all three estimates for the total number of players in Ontario reasonable?
   
   b) What estimation strategy would you have used? Justify your choice.

2. Justify your choice of estimation strategy for Part C.

**Checking**

3. a) Estimate the total number of players in Alberta. Justify your choice of estimation strategy.

   b) Calculate the total number of players in Alberta. Compare your answer to your estimate. Is your answer reasonable?

   c) Calculate how many more players there are in Ontario than in Alberta. Is your answer reasonable?

**Practising**

4. The chart shows data for soccer players in a city. How many more outdoor soccer players are there than indoor soccer players? For each step, estimate to check the reasonableness of your calculation. Justify your choices of estimation strategies.

5. Estimate to determine which calculations are reasonable. Show how you estimated. For one estimate, justify your choice of estimation strategy.

   a) $7003 - 3567 = 4436$

   b) $1259 + 745 + 5567 = 7571$

<table>
<thead>
<tr>
<th>Alberta Ringette Players</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>Bunny</td>
</tr>
<tr>
<td>Novice</td>
</tr>
<tr>
<td>Petite</td>
</tr>
<tr>
<td>Tween</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soccer Players</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>youth indoor</td>
</tr>
<tr>
<td>senior indoor</td>
</tr>
<tr>
<td>youth outdoor</td>
</tr>
<tr>
<td>senior outdoor</td>
</tr>
</tbody>
</table>
A forklift operator wants to lift several crates at one time. The forklift can safely lift up to 7000 kg at once.

**Which combination of three crates can the forklift safely lift?**

**Teresa’s Addition**

I’ll try the screws, nuts, and rivets first.
Their total mass is about 7000 kg.
I can calculate the actual mass by adding from left to right.

```
1899
3045
+2357
6000
1100
```

**Martin’s Addition**

The total mass of the screws, nuts, and rivets is about 7300 kg.
I can calculate the actual mass by regrouping.

```
1899
3045
+2357
21=2 tens + 1 one
```

A. Explain why Teresa wrote 6000 and 1100 in her first two steps.
B. Complete Teresa’s addition. Show your work.

C. Complete Martin’s addition. Show your work.

D. Can the forklift safely lift the screws, nuts, and rivets together? Why or why not?

E. Calculate the total for other combinations. What combinations can the forklift safely lift?

**Reflecting**

1. a) Why might Martin and Teresa have estimated first? 
   b) Show how you would have estimated.

2. Which addition method do you prefer for this problem? Explain.

3. Should forklift operators underestimate or overestimate the mass of the crates they want to lift? Why?

**Checking**

4. The forklift operator needs to move the original four crates, as well as these washers and bolts.
   a) Determine two new combinations of three crates that can be lifted together safely.
   b) Is there a combination of four crates that can be lifted together safely? Explain.

**Practising**

5. Estimate and then add. Show your work.
   a) \[4273 + 2539 + 1203\]  
   b) \[5689 + 1291 + 389\]  
   c) \[1657 + 2657 + 4089\]

6. Add. Show your work.
   a) \[1259 + 3618 + 987\]  
   b) \[8963 + 2364 + 1221\]

7. A larger forklift lifts four crates with a total mass of 9600 kg. What might the mass of each crate be? Explain your reasoning.
Solve Two-Step Problems

Select operations and solve two-step problems.

On the day Glynis turns 12, her aunt will turn 25.

¿ About how many days older is Glynis’s aunt than Glynis?

Glynis’s Solution

Understand
I have to find the difference between age 12 and age 25 in days.

Make a Plan
I’ll calculate my age and my aunt’s age in days by multiplying each of the number of years by 365. I’m going to ignore leap years.
Then I need to calculate the difference.

A. Carry out Glynis’s plan and solve the problem. Show your work.

Reflecting

1. Explain how Glynis might have known that the problem needed more than one step to solve.
2. Describe how you can solve the problem using a different set of steps.
Checking
3. Glynis’s brother is 2453 days older than her. Glynis’s sister is 1562 days younger than her. How many years older is Glynis’s brother than her sister?
   a) Which two operations will you perform to solve this problem? Justify your choices.
   b) Solve the problem.
   c) For each calculation, did you use mental math, pencil and paper, or a calculator? Justify your choices.

Practising
4. In October 1984, astronaut Marc Garneau became the first Canadian in space, aboard the Challenger shuttle. In January 1992, astronaut Roberta Bondar become the second Canadian in space, aboard the Discovery shuttle. How many months passed between the first and second Canadians in space? Show your work.

5. Dieter sleeps about 9 hours each day. About how many hours is he awake for each period of time?
   a) one week  
   b) one month  
   c) one year

6. James Naismith of Canada is the inventor of basketball. He was born in 1861 and invented the game of basketball at the age of 30. How many years ago did he invent basketball?

7. Create and solve a two-step problem about comparing the ages in days of two people you know.

8. Each bag contains 124 red and black candies. Altogether, there are 3173 red candies in 50 bags. How many black candies are in the bags? Show your solution.
1. Use mental math to calculate each answer. Show your strategy for two of your answers.
   a) 45 + 55
   b) 2000 + 455
   c) 9500 + 205
   d) 98 + 299
   e) 1250 + 751
   f) 1499 + 499

2. Explain how knowing that 200 + 300 = 500 can help you to calculate each answer.
   a) 199 + 299 =
   b) 205 + 325 =
   c) 500 − 199 =
   d) 250 + 350 =
   e) 198 + 302 =
   f) 500 − 301 =

3. Use estimation to decide which answers are reasonable. Correct the unreasonable answers.
   a) 3176 + 2857 = 6033
   b) 6655 − 1596 = 3059
   c) 5965 + 3582 = 9547
   d) 8087 − 1935 = 6152
   e) 256 + 118 + 978 + 253 = 1605
   f) 4508 + 497 + 3504 = 7509

4. Calculate. Show your work.
   a) 1567 + 2366 + 3856
   b) 1249 + 5555 + 2643
   c) 5488 + 1098 + 2387
   d) 1089 + 1789 + 2768
   e) 7234 + 1198 + 987
   f) 6243 + 1112 + 482

5. a) Use estimation to determine the reasonableness of two of your calculations from Question 4.
   b) Justify your choice of strategy for each estimate in part a).

6. Three crates with masses of 1099 kg, 1050 kg, and 1285 kg are in a freight elevator. The elevator can safely carry 5000 kg. A fourth crate is about to be loaded onto the elevator. What is the greatest mass it can safely be?

7. A town has a population of 9000. The circle graph shows the number of people living in three areas of the town. How many people live in Eastside? Show your solution.
Calculating Sums and Differences

Number of players: 4

How to play: Estimate sums and differences of four-digit numbers.

Step 1 Each player writes a four-digit number.

Step 2 Each player estimates the sum of all four numbers and the difference between any two of the numbers. Players record their estimates.

Step 3 Use a calculator or pencil and paper to calculate the sum and differences.

Step 4 Each player scores this number of points for each estimate:

Estimate within 1000: 1 point
Estimate within 500: 2 points

Continue for five turns. The player with the most points wins.

Norman’s Turn

I estimate that the total is about 25,000.
I estimate 9841 – 7426 is about 2400.
How many points do I get?
Communicate About a Choice of Calculation Method

Justify your choice of calculation method and explain each step in solving a problem.

A bird sanctuary has a fence that is 8567 m long. What is the length of the side along the river?

How can Drake justify his calculation methods and explain how he found the length?

Drake’s Rough Copy

I used mental math to calculate the total length of the three sides that I know. The length is 4875 m.
I used pencil and paper to subtract the length of the three sides from the perimeter: $8567 - 4875 = 3692$

Drake’s Good Copy

I used mental math to add the three sides because it was easy to do.

To add 1750 and 1250, I thought: $1000 + 1000 + 750 + 250 = 3000$
Then I added the length of the last side: $3000 + 1875 = 4875$
To subtract the total length of the three sides from the perimeter, I used pencil and paper.
The numbers were too hard to use mental math.
The length of the side along the river is 3692 m.
Checking
2. Last year, 7929 people visited the bird sanctuary from May to August. The chart shows the number of visitors so far this year. About how many visitors are needed in August to match last year’s attendance?

Marcus wrote a rough copy justifying his calculation method and explaining his steps. Write a good copy. Use the Communication Checklist.

### Visitors to Bird Sanctuary

<table>
<thead>
<tr>
<th>Month</th>
<th>Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>1228</td>
</tr>
<tr>
<td>June</td>
<td>1875</td>
</tr>
<tr>
<td>July</td>
<td>1765</td>
</tr>
</tbody>
</table>

### Marcus’s Rough Copy

The problem asks “about” how many people, so I’ll estimate.

The total this year is about 5000.

They need about 3000 visitors in August to match last year’s attendance.

Practising
3. Amanda had 8356 reward points and traded them for these items. How many reward points does she have left?
   a) Solve the problem.
   b) Make a rough copy to justify your calculation method and explain your steps.
   c) How can you improve your rough copy? Use the Communication Checklist. Then write a good copy.

### Reward Points Trade

<table>
<thead>
<tr>
<th>Item</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD player</td>
<td>2500</td>
</tr>
<tr>
<td>watch</td>
<td>500</td>
</tr>
<tr>
<td>telescope</td>
<td>2300</td>
</tr>
<tr>
<td>donation to sanctuary</td>
<td>1700</td>
</tr>
</tbody>
</table>
Adding Decimals

**Goal**
Add decimal tenths and hundredths using base ten blocks and pencil and paper.

Yoshi’s class is sending a wool sweater with a mass of 0.45 kg and an inukshuk sculpture with a mass of 1.76 kg to a class in Australia.

**What is the total mass of the two gifts?**

**Yoshi’s Addition**

I estimate that the total mass is between 2.00 kg and 2.50 kg.
I’ll use blocks to represent these amounts.

![Base ten blocks representation]

**Step 1** I model 1.76 and 0.45.

\[
\begin{array}{c|c|c}
\text{Ones} & \text{Tenths} & \text{Hundredths} \\
\hline
1 & 0.1 & 0.01 \\
\end{array}
\]

\[
1.76 + 0.45 = 2.11
\]

**Step 2** I add the hundredths.
I regroup 11 hundredths as 1 tenth and 1 hundredth.

\[
\begin{array}{c|c|c}
\text{Ones} & \text{Tenths} & \text{Hundredths} \\
\hline
1 & 0.1 & 0.01 \\
\end{array}
\]

\[
1.76 + 0.45 = 2.11
\]
1. How is adding decimals like adding whole numbers?

2. If the class sent gifts with masses of 10.76 kg and 0.45 kg, how would you line up the numbers to calculate the total with pencil and paper?

**Reflecting**

1. How is adding decimals like adding whole numbers?

2. If the class sent gifts with masses of 10.76 kg and 0.45 kg, how would you line up the numbers to calculate the total with pencil and paper?

**Checking**

3. Over the year, the class sent other packages to Australia. Each package contained several items. Estimate and then calculate the total mass of each package.
   a) 0.85 kg and 5.38 kg  
   b) 1.25 kg, 1.65 kg, and 0.90 kg

**Practising**

4. Estimate and then add. Show your work.
   a) 5.9 + 4.9  
   b) 5.76 + 3.98  
   c) 4.7 + 2.5  
   d) 3.66 + 2.34 + 0.85

5. Create a problem that involves the addition of two decimal numbers. Solve your problem.
Use various methods to calculate the cost of purchases.

The class has this much money to buy magazine subscriptions.

They voted to buy *National Geographic for Kids* and *Owl*. They want to buy one more.

### Magazine Subscriptions

<table>
<thead>
<tr>
<th>Magazine</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Boys' Life</em></td>
<td>12 issues: $54.74</td>
</tr>
<tr>
<td><em>Owl</em></td>
<td>10 issues: $29.95</td>
</tr>
<tr>
<td><em>National Geographic for Kids</em></td>
<td>10 issues: $35.95</td>
</tr>
<tr>
<td><em>Girls' Life</em></td>
<td>6 issues: $27.50</td>
</tr>
<tr>
<td><em>Sports Illustrated for Kids</em></td>
<td>12 issues: $29.90</td>
</tr>
</tbody>
</table>

**Which other subscription can they buy?**

**Patrick's Method**

First I’ll calculate the cost of the subscriptions to *National Geographic for Kids* and *Owl*. I’ll regroup the cents so it’s easier to add.

\[
\begin{align*}
35.95 + 29.95 & = 35.90 + 30.00 \\
5\text{¢} & \quad (\text{regrouped}) \\
\end{align*}
\]

**Juanita's Method**

To get an exact cost, I’ll add cents, dimes, and dollars.

\[
\begin{align*}
1 & \\
35.95 & + 29.95 \\
0 & = 1 \text{ dime} + 0\text{¢} \\
11 & \\
35.95 & + 29.95 \\
0.90 & = 10\text{¢} + 90\text{¢} + 90\text{¢} = 190\text{¢} \\
& = $1 + 9 \text{ dimes}
\end{align*}
\]
A. Use mental math to complete Patrick’s method. Explain what you did.

B. Complete Juanita’s method.

C. How much money does the class have left to spend after buying these two subscriptions?

D. Which other subscription can the class buy? How do you know?

Reflecting

1. Teresa used Patrick’s method, but she transferred 5¢ from $29.95 to $35.95 instead. Would you transfer like Patrick or like Teresa? Why?

2. Juanita regrouped 190¢ as $1 and 9 dimes. How did this step help with the final step of the calculation?

3. Would you use Patrick’s method or Juanita’s method to calculate the total cost of subscriptions to Boys’ Life and Girls’ Life? Give a reason for your choice.

Checking

4. Estimate and calculate the total cost of each set of subscriptions. Show your work.
   a) Boys’ Life and Owl
   b) Boys’ Life and National Geographic for Kids
   c) Owl, Girls’ Life, and Sports Illustrated for Kids

Practising

5. Estimate and then add. Show your work.
   a) 1.99 + 2.01 = 4.00
   c) 4.25 + 15.75 = 20.00
   e) 9.99 + 1.75 = 11.74
   b) 45.67 + 24.79 = 70.46
   d) 28.63 + 12.88 = 41.51
   f) 85.20 + 1.75 + 10.93 = 97.88
Karin’s family plans to use earthworms to turn their garbage into food for plants. They have $100 to spend.

How much change will they receive after buying these items?

**Prices (tax included)**
- compost bin: $28.75
- kitchen compost carrier: $24.24
- bag of red wiggler worms: $14.38

**Karin’s Method**

The total cost is $93.76. I count on from $93.76 to $100 to calculate the amount of change.

**Norman’s Method**

The total cost is $93.76. I use mental math to calculate the amount of change by subtracting in parts.

\[
\text{\$100.00 - \$93.76} = \text{\$100.00 - \$90.00 - \$3.00 - 76\text{¢}} \\
\hspace{1cm} \text{\$7.00 - 76\text{¢}}
\]

A. Complete Karin’s method. Use a number line.

B. Check your answer by completing Norman’s method.
Reflecting

1. Karin and Norman calculated the total cost. Would you use mental math, pencil and paper, or a calculator to calculate the total? Justify your choice.

2. Which method of calculating the amount of change do you prefer? Explain your choice.

Checking

3. Yasmina’s class has $90 to purchase these materials.
   a) What is the total cost of the purchase?
   b) Use Norman’s method to calculate the change.
   c) Use Karin’s method to check your answer.

Practising

4. Calculate the total cost and the amount of change.
   a)  
   b)  
   c)  

5. You have $100 to spend at a store with these items.
   a) Choose two items. Calculate the total cost of the items. Show your work.
   b) Calculate the amount of change you will receive. Show your work.

6. What is the cost of Yoshi’s purchase? How much change did he receive? Show your work.

Yoshi’s Purchase

25¢ more is $18.00 and $2.00 makes $20.00.
Subtracting Decimals

Use base ten blocks and pencil and paper to subtract decimal tenths and hundredths.

Sofia’s dog eats 0.75 kg of dog food each day. She has 3.00 kg of dog food.

How much dog food will be left after one day?

Sofia’s Subtraction

First I’ll estimate. 3.00 – 0.75 is close to 3 – 1 = 2, so there will be more than 2 kg of food left.

Next I’ll subtract 7 tenths 5 hundredths from 3. I’ll use blocks to represent these amounts.

Step 1: I model 3.00 kg.

\[
\begin{array}{c|c|c}
\text{Ones} & \text{Tenths} & \text{Hundredths} \\
\hline
1 & 0.1 & 0.01 \\
\end{array}
\]

\[
\begin{array}{c|c|c}
\text{Ones} & \text{Tenths} & \text{Hundredths} \\
\hline
\text{3.00} & \text{2} & \text{1} \\
\hline
\text{– 0.75} & \text{0} & \text{1} \\
\hline
\end{array}
\]

Step 2: I regroup 1 one as 10 tenths, so I can take away 7 tenths. Now I have 2 ones and 10 tenths.

\[
\begin{array}{c|c|c|c}
\text{Ones} & \text{Tenths} & \text{Hundredths} \\
\hline
\text{2} & \text{10} & \text{2} \\
\hline
\text{3.00} & \text{3} & \text{1} \\
\hline
\text{– 0.75} & \text{2} & \text{1} \\
\hline
\end{array}
\]
Step 3  I regroup 1 tenth as 10 hundredths, so I can take away 5 hundredths. Now I have 2 ones, 9 tenths, and 10 hundredths.

\[
\begin{array}{c|c|c}
\text{Ones} & \text{Tenths} & \text{Hundredths} \\
\hline
2 & 9 & 10 \\
3.00 & & \\
-0.75 & & \\
\hline
2.25 & & \\
\end{array}
\]

There will be 2.25 kg of dog food left after one day.

Step 4  Now I can subtract 7 tenths and 5 hundredths.

\[
\begin{array}{c|c|c}
\text{Ones} & \text{Tenths} & \text{Hundredths} \\
\hline
2 & 1 & 0 \\
3.00 & & \\
-0.75 & & \\
\hline
2.25 & & \\
\end{array}
\]

Dan’s Subtraction

To calculate the amount of dog food, I’ll count up from 0.75 to 3.00.

Step 1  I add 0.25 to 0.75 to get to 1.00.

Step 2  I count 2.00 to get from 1.00 to 3.00.

I need to add 2.00 to 0.25.

There will be 2.25 kg of dog food left after one day.
Reflecting

1. a) Can Sofia use a small cube instead of a flat to represent 1 kg? Explain.
   b) Can she use a large cube or a stack of 10 flats to represent 1 kg? Explain.

2. How can subtracting 75 from 300 help with subtracting 0.75 from 3.00?

3. Can Dan use another way to count up from 0.75 to 3.00? Explain.

Checking

4. How many days will the dog food last?
   Use subtraction to calculate how much food will be left after each day.
   Record your answers in a table.

Practising

5. The height of a truck is 3.85 m. How much clearance does the truck have when it goes under a sign that is 5.00 m above the ground?

6. Lynne starts from school and runs 1.85 km north.
   She then runs another 2.50 km north.
   She turns around and runs 1.45 km south.
   How far does she have to run to return to school?

7. Estimate and then calculate. Show your work.
   a) \(1.5 - 0.7 = \)  
   c) \(4.35 - 1.70 = \)  
   e) \(\_ + 0.75 = 2.00\)
   b) \(1.65 - 0.88 = \)  
   d) \(4.00 - 2.85 = \)  
   f) \(12.05 + 4.75 = \)

8. Benjamin entered a whole number into a calculator.
   Then he subtracted a decimal number.
   The answer was 4.75.
   a) What whole number might Benjamin have entered?
      Explain your reasoning.
   b) What number might Benjamin have subtracted?
      Explain your reasoning.
Adding and Subtracting Close to Hundreds

You can add and subtract numbers ending in 97, 98, or 99 by thinking of the nearest hundred.

To add 98 to 56, add 100 and subtract 2.

\[
56 + 98 = \quad 56 + 100 = 156 \\
156 - 2 = 154
\]

To subtract 98 from 185, subtract 100 and add 2.

\[
185 - 98 = \quad 185 - 100 = 85 \\
85 + 2 = 87
\]

A. Why do you add 100 and subtract 2 instead of adding 98?

B. Why do you subtract 100 and add 2 instead of subtracting 98?

Try These

1. Calculate each sum.
   a) 88 + 98  
   b) 68 + 99  
   c) 199 + 58  
   d) 135 + 198

2. Calculate each difference.
   a) 134 − 98  
   b) 167 − 99  
   c) 335 − 199  
   d) 567 − 298
CHAPTER 4

Skills Bank

1. Use mental math to calculate each answer.
   a) $12 + 48$         c) $99 + 157$    e) $249 + 251$    g) $4000 - 750$
   b) $75 + 75$        d) $250 + 751$    f) $7000 - 45$    h) $2456 + 3000$

2. Explain how knowing $350 + 250 = 600$ can help you
to calculate each answer.
   a) $349 + 250$        b) $348 + 248$    c) $600 - 350$    d) $600 - 249$

3. A Grade 5 class is collecting pop can tabs.
   Their goal is to collect 3000 tabs in five weeks.
   Use mental math to calculate how many more
   tabs they need to collect after each week.
   a) In the first week, they collected 1000.
   b) In the second week, they collected 302.
   c) In the third week, they collected 698.
   d) In the fourth week, they collected $250 + 450$.

4. Use estimation to decide which answers are reasonable.
   Correct the unreasonable answers.
   a) $4555 + 2588 = 7143$         d) $7056 - 4935 = 2121$
   b) $9177 - 2989 = 7188$        e) $3499 + 1257 + 3751 = 6507$
   c) $1965 + 5678 = 7643$        f) $185 + 650 + 203 + 498 = 1038$

5. a) A plane flew 3387 km from Vancouver to
      Toronto and then flew back to Vancouver.
      How far did the plane travel altogether?
      b) Is your answer reasonable?

6. a) A crane lifts three crates
      with masses of 1249 kg,
      2758 kg, and 4496 kg.
      How many kilograms
      is the crane lifting?
      b) Is your answer reasonable?
7. a) Three schools recycled telephone books to raise money. How many telephone books did they recycle altogether? 
   b) Is your answer reasonable?

   **Telephone Books Recycled**
<table>
<thead>
<tr>
<th>School</th>
<th>Number of books</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lakeview</td>
<td>1259</td>
</tr>
<tr>
<td>Northside</td>
<td>2685</td>
</tr>
<tr>
<td>Southside</td>
<td>3107</td>
</tr>
</tbody>
</table>

8. **Estimate.**
   a) 1457 + 2856  
   b) 4567 + 1289 + 3167  
   c) 4445 + 1287 + 2099

9. **Add. Show your work.**
   a) 2485 + 3888 + 189  
   b) 1666 + 2345 + 1765  
   c) 6006 + 9898 + 4592

10. The chart shows the population of each age group in the towns of Harrisburg and Newton.
   a) What is the total population in each town?
   b) Which town has more people?

   **Populations of Age Groups**
<table>
<thead>
<tr>
<th>Ages (years)</th>
<th>Harrisburg</th>
<th>Newton</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–12</td>
<td>2931</td>
<td>5343</td>
</tr>
<tr>
<td>13–18</td>
<td>2876</td>
<td>2111</td>
</tr>
<tr>
<td>over 18</td>
<td>4659</td>
<td>3651</td>
</tr>
</tbody>
</table>

11. **Estimate.**
   a) 2000 − 1775 =  
   b) 9999 − 6789 =  
   c) 7000 − 4899 =

12. **Calculate. Show your work.**
   a) 9458 − 1822  
   b) 4023 − 1512  
   c) 3032 − 2643

13. The Eagles hockey team sold 7000 tickets for four home games. The chart shows the number of tickets sold for three of the games. How many tickets were sold for the fourth game?

   **Eagles Ticket Sales**
<table>
<thead>
<tr>
<th>Game</th>
<th>Tickets sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eagles vs. Ravens</td>
<td>1456</td>
</tr>
<tr>
<td>Eagles vs. Gulls</td>
<td>1389</td>
</tr>
<tr>
<td>Eagles vs. Crows</td>
<td>2345</td>
</tr>
<tr>
<td>Eagles vs. Hawks</td>
<td></td>
</tr>
</tbody>
</table>
   a) $0.9 \div 11001$
   b) $3.28 \div 11001$
   c) $0.92 \div 11001$
   d) $15.75 \div 11001$

15. Add. Show your work.
   a) $2.5 + 3.4$
   b) $0.01 + 2.03$
   c) $12.56 + 3.67$
   d) $12.44 + 6.55$

16. Ryan bought 3.85 kg of cheddar cheese and 1.36 kg of blue cheese. How much cheese did he buy?

17. Add. Show your work.
   a) $12.56 + $8.99
   b) $16.75 + $4.25
   c) $12.99 + $23.98

18. Estimate.
   a) $45.45 + $42.65
   b) $35.75 + $40.29
   c) $15.76 + $23.35 + $28.79

19. Calculate the total cost and the amount of change for each purchase.
   a)
   b)
   c)
   d)

20. Estimate.
   a) $3.61 - 2.53$
   b) $12.5 - 2.7$
   c) $9.85 - 0.54$
   d) $15.75 - 4.99$
   e) $92.56 - 23.84$
   f) $64.32 - 2.73$

21. Calculate. Show your work.
   a) $9.70 - 3.25 = $
   b) $3.54 - 2.86 = $
   c) $54.29 - 3.25 = $
   d) $4.80 + = 32.75$
   e) $15.68 + = $50.00$
   f) $100.00 - 43.49 = $
1. The list shows some numbers that can be made by adding or subtracting only the numbers 100, 300, and 900. Complete the rest of the list from 600 to 1300.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
</tr>
<tr>
<td>300</td>
<td>100</td>
<td>300</td>
<td>100</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>300</td>
<td>900</td>
<td>100</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>300</td>
<td>900</td>
<td>100</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>300</td>
<td>900</td>
<td>100</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>300</td>
<td>900</td>
<td>100</td>
<td>300</td>
<td>100</td>
</tr>
</tbody>
</table>

2. Which three consecutive four-digit numbers have a sum of 3768? Explain your reasoning.

3. Which two four-digit numbers have a sum of 8000 and a difference of 500? Explain your reasoning.

4. a) Calculate the total.

   b) Change one digit in each price so the total cost is still the same. Look for one more solution. Show your work.

5. Keifer bought a set of novels for $29.95 and a dictionary for $30.50. He paid with five bills and two coins. He received this amount of change. What bills and coins did he use to pay for the books?

6. In a magic square, the numbers in the columns, rows, and diagonals have the same sum. Which numbers are missing from this magic square?
Chapter Review

1. Use mental math to calculate each answer. Show your strategy for two of your answers.
   a) $75 + 125$  
   c) $149 + 149$  
   e) $450 + 355$
   b) $500 - 198$  
   d) $1000 - 399$  
   f) $1500 + 2252$

2. Anna is reading a book that has 760 pages.
   a) She read 199 pages in the first week. Use mental math to calculate the number of pages she has left to read.
   b) She read 175 pages in the second week and 125 pages in the third week. How many pages has she read in all? How many pages does she have left to read?
   c) She read the remaining pages in the fourth and fifth weeks. What number of pages might she have read in each of those two weeks?

3. Use estimation to decide which answers are reasonable. Correct the unreasonable answers.
   a) $6652 + 2345 = 8997$  
   b) $6099 - 1998 = 5101$
   c) $7056 - 2935 = 4121$  
   d) $6754 + 300 + 1846 = 8900$

4. a) Show your work for two of the estimates in Question 3.
   b) For the same two estimates, justify your choice of estimation strategy.

5. Estimate and then add. Show your work.
   a) $5329 + 2379 + 365$  
   b) $2923 + 1079 + 3299$  
   c) $3327 + 6938 + 1482$

6. A truck can carry up to 8000 kg. Can it safely carry masses of 1875 kg, 2972 kg, and 3210 kg? Explain.

7. 9750 people attended a four-day festival. The chart shows the number of people who attended each day for the first three days.
   a) How many people attended on the fourth day?
   b) For each step, what operation did you use? Why?
   c) For each step, did you use mental math, a calculator, or pencil and paper? Why?

<table>
<thead>
<tr>
<th>Festival Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>
8. For each calculation, would you use pencil and paper, mental math, or a calculator? Justify your choice.
   \(a)\) \(7050 + 250 + 900 + 3054\)  \(c)\) \(23\ 544 - 9089\)
   \(b)\) \(8965 - 6392\)  \(d)\) \(998 + 8000 + 1002 + 6025\)

9. Estimate and then add. Show your work.
   \(a)\) \(4.75 + 1.90\)  \(b)\) \(2.07 + 3.65\)  \(c)\) \(6.98 + 7.07\)  \(d)\) \(12.88 + 2.96\)

10. The rectangular bulletin board in Corina’s class is 1.75 m wide and 0.85 m long. What is the perimeter of the bulletin board?

11. Calculate the total cost and the amount of change for each purchase.
   \(a)\)
   \(\text{Penny} \quad \$12.89 \quad \text{Quarters} \quad \$4.35 \quad \text{Dimes} \quad \$16.99\)
   \(b)\)
   \(\text{Penny} \quad \$24.99 \quad \text{Quarters} \quad \$18.98 \quad \text{Dimes} \quad \$60.99 \quad \text{Dollars} \quad \$12.75\)
   \(c)\)
   \(\text{Penny} \quad \$22.25 \quad \text{Quarters} \quad \$18.98 \quad \text{Dimes} \quad \$18.99 \quad \text{Dollars} \quad \$16.99\)

12. Estimate and then calculate. Show your work.
   \(a)\) \(4.00 - 0.98\)  \(b)\) \(9.82 - 2.7\)  \(c)\) \(3.00 - 1.43\)  \(d)\) \(14.56 - 10.78\)

13. \(a)\) Calculate the perimeter of each triangle.
    \(b)\) How much greater is the perimeter of the larger triangle than the perimeter of the smaller triangle?

\(\text{Triangle 1:} \quad 2.45\ m \quad 1.55\ m \quad 1.67\ m\)
\(\text{Triangle 2:} \quad 5.67\ m \quad 3.65\ m \quad 2.88\ m\)
Chapter Task

Counting Calories

Nutritionists recommend that you eat food containing from 2200 to 2500 Calories each day. Jose recorded everything he ate on Saturday and Sunday.

Jose’s Food Record

<table>
<thead>
<tr>
<th></th>
<th>Saturday</th>
<th></th>
<th>Sunday</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>Calories</td>
<td>Cost</td>
<td>Food</td>
<td>Calories</td>
</tr>
<tr>
<td>restaurant breakfast</td>
<td>710</td>
<td>$2.89</td>
<td>cereal with fruit</td>
<td>313</td>
</tr>
<tr>
<td>large orange juice</td>
<td>250</td>
<td>$1.99</td>
<td>350 mL orange juice</td>
<td>160</td>
</tr>
<tr>
<td>355 mL can of pop</td>
<td>150</td>
<td>$1.50</td>
<td>50 g cashews</td>
<td>50</td>
</tr>
<tr>
<td>10 chicken nuggets</td>
<td>510</td>
<td>$4.29</td>
<td>tuna sandwich</td>
<td>361</td>
</tr>
<tr>
<td>chocolate milkshake</td>
<td>1150</td>
<td>$3.29</td>
<td>vanilla yogurt</td>
<td>165</td>
</tr>
<tr>
<td>french fries</td>
<td>610</td>
<td>$2.19</td>
<td>apple</td>
<td>80</td>
</tr>
<tr>
<td>355 mL can of pop</td>
<td>150</td>
<td>$1.50</td>
<td>hard-boiled egg</td>
<td>75</td>
</tr>
<tr>
<td>spaghetti</td>
<td>640</td>
<td>$7.99</td>
<td>200 mL juice pack</td>
<td>95</td>
</tr>
<tr>
<td>garlic bread</td>
<td>340</td>
<td>$4.00</td>
<td>chicken and vegetables</td>
<td>847</td>
</tr>
<tr>
<td>6 buffalo wings</td>
<td>330</td>
<td>$3.99</td>
<td>orange</td>
<td>65</td>
</tr>
<tr>
<td>large pop</td>
<td>397</td>
<td>$1.99</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What can you conclude about what Jose ate each day?

A. Calculate the number of Calories over or under the recommended number Jose ate each day.

B. How much more did Saturday’s meals cost than Sunday’s meals?

C. Investigate data about Calories in foods that you like to eat. Use the data to plan three meals and snacks for one day with total Calories in the recommended range.

Task Checklist

- Did you estimate to check?
- Did you justify your choice of estimation strategy?
- Did you justify your choice of calculation method?
- Did you show all your steps?
- Did you explain your thinking?