Vocabulary

Choose the best term from the box.

- Associative Property of Addition
- Commutative Property of Addition
- difference
- sum

1. Using the __?__ you can add two numbers in any order.

2. The __?__ is the answer to a subtraction problem.

3. When you can change the grouping of numbers when adding you are using the __?__.

4. The answer in an addition problem is called the __?__.

3 The bones in a human's leg are not the same length. Do you know the difference in the length of the bones? You will find out in Lesson 2-6.

4 The world's largest aloha shirt measures more than 4 meters around the chest. What is the actual measure of this part of the shirt? You will find out in Lesson 2-2.

Rounding

Round each number to the nearest hundred.

5. 748   6. 293   7. 139

Round each number to the nearest thousand.

8. 3,857   9. 2,587   10. 2,345

Round each number to the underlined digit.

11. 84.59   12. 2.948   13. 3.0125

Estimating

Writing to Explain Write an answer for the question.

14. Explain how to use rounding when estimating.

Mental Math

How can you use mental math to add and subtract?

Jon bought 3 items. Properties of addition can help him find the sum of the cost.
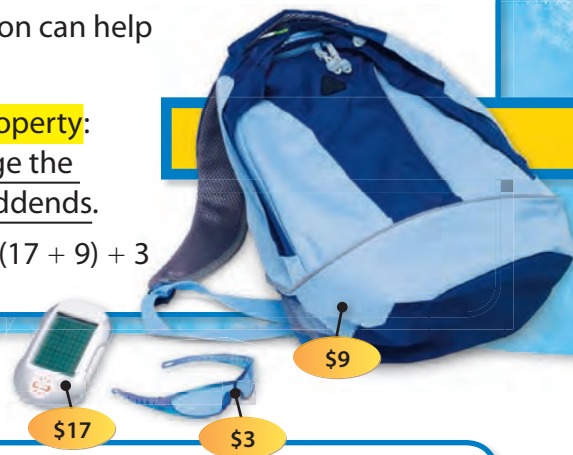
Commutative Property:
You can add two numbers in any order.

$17 + 9 = 9 + 17$

Associative Property:
You can change the grouping of addends.

$17 + (9 + 3) = (17 + 9) + 3$

$9

$17

$3

Another Example   How can you use compensation to add or subtract?

Sometimes you can change an addition or subtraction problem to make it simpler. With **compensation** you adjust one number to make computation easier and compensate by changing the other number.

Using compensation to add

Find $39 + 17$ mentally.

Think $40 + 17 = 57$

1 more than 39

So, the final answer is 1 less than 57.

$39 + 17 = 56$

Using compensation to subtract

Find $86 - 19$ mentally.

Think $86 - 20 = 66$

1 more than 19

So, the final answer is 1 more than 66.

$86 - 19 = 67$

Explain It

1. In the first example above, why is the answer 1 less than 57? In the second example above, why is the answer 1 more than 66?

2. The equation $0 + 7 = 7$ is an example of the Identity Property of Addition. What is the sum when you add zero to any number?

The Commutative and Associative Properties make it easy to add $17 + 9 + 3$.

17 and 3 are <mark>compatible numbers</mark>. These are numbers that are easy to compute mentally.

$17 + 3 = 20$

$20 + 9 = 29$

So, $17 + 9 + 3 = 29$.

The total cost is $29.

Why It Works

Commutative Property: change the order

$17 + (9 + 3) = 17 + (3 + 9)$

Associative Property: change the grouping

$17 + (3 + 9) = (17 + 3) + 9$

Guided Practice*

Do you know **HOW**?

In **1** through **6**, use mental math to add or subtract.

1. $21 + 9 + 12$

2. $35 + 46 + 4$

3. $19 + 34$

4. $38 + 15$

5. $47 - 19$

6. $86 - 49$

Do you **UNDERSTAND**?

7. Writing to Explain Which numbers are easier to subtract, $141 - 99$ or $142 - 100$? Explain.

8. Jim earns $22, $14, and $8 on three different days. How much did he earn in all? Use mental math to find the sum.

Independent Practice

In **9** through **26**, use mental math to add or subtract.

Tip When you add 3 or more numbers, look for compatible numbers.

9. $66 + 18 + 2$

10. $97 + 3 + 64$

11. $22 + 46 + 4$

12. $237 + 195 + 5$

13. $39 + 23 + 1$

14. $57 + 42 + 3$

15. $96 + 73 + 4$

16. $299 + 34 + 1 + 6$

17. $306 + 199$

18. $453 - 98$

19. $49 + 87$

20. $68 - 29$

21. $1,003 + 58$

22. $468 - 190$

23. $379 + 621$

24. $230 + 215 + 70$

25. $201 - 99$

26. $101 + 17 + 99$

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27. **Writing to Explain** Use the Equal Additions Property shown at the right to find each difference mentally. Explain how you found each difference.

a 67 − 29 **b** 456 − 198

Tip *Equal Additions Property:*

Subtract 369 − 199 *mentally.*

369 − 199.   *If the same number*
+1   +1   *is added to each, the*
↓   ↓   *difference is the same.*
370 − 200 = 170

28. The table at the right shows points scored by one team during a football game. Use mental math to find how many points the football team had scored after the first three quarters.

Quarter	Points
1	14
2	9
3	6
4	10

29. On three different days at her job, Sue earned $27, $33, and $49. She needs to earn $100 to buy a desk for her computer. The cost of the desk includes tax. If she buys the desk, how much money will she have left over?

30. A CD shelf can hold 50 CDs. Jill has 27 CDs. She plans to buy 5 new ones. Each CD costs $9. After she buys the new ones, how many more CDs will the shelf hold?

31. Three different gymnasts had scores of 8.903, 8.827, and 8.844. Order the scores from greatest to least.

A 8.827, 8.844, 8.903

B 8.844, 8.903, 8.827

C 8.903, 8.844, 8.827

D 8.827, 8.903, 8.844

32. Which shows the Associative Property of Addition?

A 3 + 10 = 10 + 3

B 10 + 0 = 10

C (3 + 10) + 7 = 3 + (10 + 7)

D (3 + 10) + 7 = (10 + 3) + 7

33. André buys 12 apples at $1 each. He uses a coupon for $1.50 off the total purchase. How much did André spend on apples?

A $10.50

B $11.00

C $11.50

D $12.00

34. Which number, when rounded to the nearest ten thousand, is 70,000?

A 6,499

B 7,499

C 64,985

D 74,999

Mixed Problem Solving

1. How much farther is Venus from the Sun than Mercury?

Venus	67,200,000	
Mercury	36,000,000	?

2. Is the distance from the Sun to Jupiter greater than or less than the sum of the distances from the Sun to the inner four planets?

3. Which planet has a distance that is closest to 1 billion miles?

4. Neptune is the farthest planet from the Sun. How much farther from the Sun is Neptune than Earth?

Data

Average Distances from the Sun (in miles)	
Mercury	36,000,000
Venus	67,200,000
Earth	93,000,000
Mars	141,600,000
Jupiter	483,700,000
Saturn	886,500,000
Uranus	1,783,900,000
Neptune	2,795,100,000

5. The diagram below shows about how much of Earth's surface is covered by water. About how much of Earth's surface is NOT covered by water?

6. A single drop of water doesn't seem like much, but many drips of water from one faucet can quickly add up to several gallons per day. If the number of drips from a faucet is 30 per minute, how many drips is this for 10 minutes? Use repeated addition.

7. Strategy Focus Solve using the strategy, Look for a Pattern.

Jack has fish as pets. Every time he buys some new fish, he buys a larger tank to fit them. Jack needs a 1-gallon tank for 3 fish, 2-gallon-tank for 6 fish, and a 3-gallon tank for 9 fish. If the pattern continues, how large of a tank will he need for 27 fish?
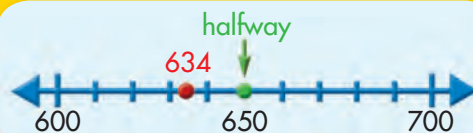
Lesson
2-2

NS 1.1 Estimate, round, and manipulate very large (e.g. millions) and very small (e.g. thousandths) numbers.

Rounding Whole Numbers and Decimals

How can you round whole numbers and decimals?

Rounding replaces one number with another number that tells about how many or how much. Round 634 to the nearest hundred.

halfway
634

600   650   700

Think Is 634 closer to 600 or 700?

Another Example

How do you round 2.36 to the nearest tenth?

Think Is 2.36 closer to 2.3 or 2.4?

2.36

2.3   2.4

Step 1

Find the rounding place. Look at the digit to the right of the rounding place.

2.36

Step 2

If the digit is 5 or greater, add 1 to the rounding digit. If the digit is less than 5, leave the rounding digit alone.

Since 6 > 5, add 1 to the 3.

Step 3

Drop the digits to the right of the rounding digit.

2.36 rounds to 2.4

Guided Practice*

Do you know HOW?

In **1** through **6**, round each number to the place of the underlined digit.

1. 1<u>6</u>

2. 5<u>6</u>.1

3. 1.3<u>2</u>

4. 4<u>2</u>7,841

5. <u>1</u>,652

6. <u>5</u>82,062

Do you UNDERSTAND?

7. To round 7,458 to the nearest hundred, which digit do you look at? What is 7,458 rounded to the nearest hundred?

8. A runner is running on a track with markers every 10 meters. If the runner has run 368 meters, is she closer to the 360-meter marker or the 370-meter marker?

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DIGITAL

For another example, see Set B on page 48.

Find the digit in the rounding place. Underline this digit.

6̲34

Look at the digit to the right of the rounding place. If this digit is 5 or greater, add 1 to the rounding digit. If the digit is less than 5, leave the rounding digit alone.

6**3**4   3 < 5

Leave 6 the same.

Change all the digits to the right of the rounding digit to zeros.

634 rounds to 600.

Independent Practice

In **9** through **16**, round each whole number to the place of the underlined digit.

9. 6̲77

10. 4,5̲26

11. 12,0̲64

12. 5̲73

13. 3̲4,739

14. 5̲9,304

15. 93̲0,998

16. 74̲8,397

In **17** through **24**, round each number to the place of the underlined digit.

17. 75̲.8

18. 0.75̲8

19. 643̲.82

20. 0.4̲72

21. 84.7̲32

22. 738.2̲9

23. 5.02̲8

24. 23.00̲9

Problem Solving

25. The world's largest aloha shirt is 4.26 meters around the chest. Round 4.26 to the nearest ones place and nearest tenths place.

26. In the first 3 quarters of a basketball game, a team scored 17, 25, and 13 points. Their final score was 75. How many points did the team score in the fourth quarter?

27. An African Watusi steer's horn measures 95.25 cm around. What is 95.25 when rounded to the nearest tenth? Nearest whole number? Nearest ten?

28. In a recent year, the population of Illinois was 12,653,544. What is that population when rounded to the nearest million?

    A 10,000,000   **B** 12,000,000   **C** 12,600,000   **D** 13,000,000

29. The world land speed record set on October 15, 1997, was 763.03 miles per hour. What is this speed rounded to the nearest ones place?

Lesson
2-3

NS 1.1 Estimate, round, and manipulate very large (e.g. millions) and very small (e.g. thousandths) numbers.

Estimating Sums and Differences

How can you estimate sums?

Students are collecting cans of dog food to give to an animal shelter. Estimate the sum of the cans collected in Weeks 3 and 4.

Week	Cans of dog food
1	172
2	298
3	237
4	345
5	338

Another Example **How can you estimate differences?**

Estimate 22.8 − 13.9.

One Way

Round each addend to the nearest whole number.

$$22.8 \longrightarrow 23$$
$$-\ 13.9 \longrightarrow -\ 14$$
$$\overline{9}$$

22.8 − 13.9 is about 9.

Another Way

Substitute compatible numbers.

$$22.8 \longrightarrow 25$$
$$-\ 13.9 \longrightarrow -\ 15$$
$$\overline{10}$$

22.8 − 13.9 is about 10.

Explain It

1. Which estimate is closer to the actual difference? How can you tell without subtracting?

2. When is it appropriate to estimate an answer?

Guided Practice*

Do you know HOW?

In **1** through **6**, estimate the sums and differences.

1. 49 + 22
2. 86 − 18
3. 179 + 277
4. 232 − 97
5. 23.8 − 4.7
6. 87.2 + 3.9

Do you UNDERSTAND?

7. Give an example of when estimating is useful.

8. The students in the example at the top collected more cans of dog food in week 4 than in week 3. Estimate about how many more.

Round each addend to the nearest hundred.

$$
\begin{array}{r}
237 \longrightarrow 200 \\
+\ 345 \longrightarrow +\ 300 \\
\hline
500
\end{array}
$$

237 + 345 is about 500. The students collected about 500 cans of dog food in Weeks 3 and 4.

Substitute compatible numbers. Compatible numbers are easy to add.

$$
\begin{array}{r}
237 \longrightarrow 250 \\
+\ 345 \longrightarrow +\ 350 \\
\hline
600
\end{array}
$$

237 + 345 is about 600. The students collected about 600 cans of dog food in Weeks 3 and 4.

Independent Practice

In **9** through **24**, estimate each sum or difference.

9. $\begin{array}{r} 79 \\ +\ 32 \\ \hline \end{array}$

10. $\begin{array}{r} 788 \\ -\ 572 \\ \hline \end{array}$

11. $\begin{array}{r} 103 \\ +\ 798 \\ \hline \end{array}$

12. $\begin{array}{r} 2,488 \\ -\ 1,320 \\ \hline \end{array}$

13. $\begin{array}{r} 64 \\ +\ 48 \\ \hline \end{array}$

14. $\begin{array}{r} 837 \\ +\ 488 \\ \hline \end{array}$

15. $\begin{array}{r} 51 \\ -\ 18 \\ \hline \end{array}$

16. $\begin{array}{r} 7,889 \\ +\ 6,455 \\ \hline \end{array}$

17. $\begin{array}{r} 184 \\ -\ 58 \\ \hline \end{array}$

18. $\begin{array}{r} 847 \\ -\ 379 \\ \hline \end{array}$

19. $\begin{array}{r} 385,600 \\ -\ 235,700 \\ \hline \end{array}$

20. $\begin{array}{r} 7,947,000 \\ -\ 3,119,000 \\ \hline \end{array}$

21. 3,205 − 2,812

22. 93 − 46

23. 1,052 + 963

24. 149 − 51

In **25** through **39**, estimate each sum or difference.

25. $\begin{array}{r} 2.9 \\ +\ 3.9 \\ \hline \end{array}$

26. $\begin{array}{r} 7.28 \\ -\ 1.32 \\ \hline \end{array}$

27. $\begin{array}{r} \$11.33 \\ +\ \$32.43 \\ \hline \end{array}$

28. $\begin{array}{r} \$12.99 \\ -\$\ 3.95 \\ \hline \end{array}$

29. $\begin{array}{r} 8.1 \\ 3.7 \\ +\ 7.9 \\ \hline \end{array}$

30. $\begin{array}{r} 3.8 \\ 4.1 \\ +\ 3.3 \\ \hline \end{array}$

31. $\begin{array}{r} 67.9 \\ +\ 81.34 \\ \hline \end{array}$

32. $\begin{array}{r} 78.111 \\ +\ 46.032 \\ \hline \end{array}$

33. 77.11 − 8.18

**34.** 35.4 − 7.8

35. 89.66 − 27.9

36. 99.9 − 27.9

37. 22.8 + 49.2 + 1.7

38. 67.5 − 13.7

39. $9.10 + $48.50 + $5.99

40. Writing to Explain The cost of one CD is $16.98, and the cost of another CD is $9.29. Brittany estimated the cost of these two CDs to be about $27. Did she overestimate or underestimate? Explain.

41. Martha cycled 14 miles each day on Saturday and Monday, and 13 miles each day on Tuesday and Thursday. How many miles did she cycle in all?

42. One fifth-grade class has 11 boys and 11 girls. A second fifth-grade class has 10 boys and 12 girls. There are 6 math teachers. To find the total number of fifth-grade students, what information is not needed?

    A The number of girls in the first class.

    B The number of boys in the first class.

    C The number of math teachers.

    D The number of boys in the second class.

43. On vacation, Steven spent $13 each day on Monday and Tuesday. He spent $9 each day on Wednesday and Thursday. If Steven brought $56 to spend, how much did he have left to spend?

44. Estimate 74.05 + 9.72 + 45.49 by rounding to the nearest whole number. What numbers did you add?

    A 75, 10, and 46   **C** 74, 10, and 45

    B 74.1, 9.7, and 45.5   **D** 75, 10, and 50

45. Golden Gate Park is located in San Francisco, California. The park covers 1,017 acres and has been compared to the size and shape of Central Park in New York City. Central Park covers 843 acres. About how many more acres does Golden Gate Park cover than Central Park?

Central Park

Golden Gate Park
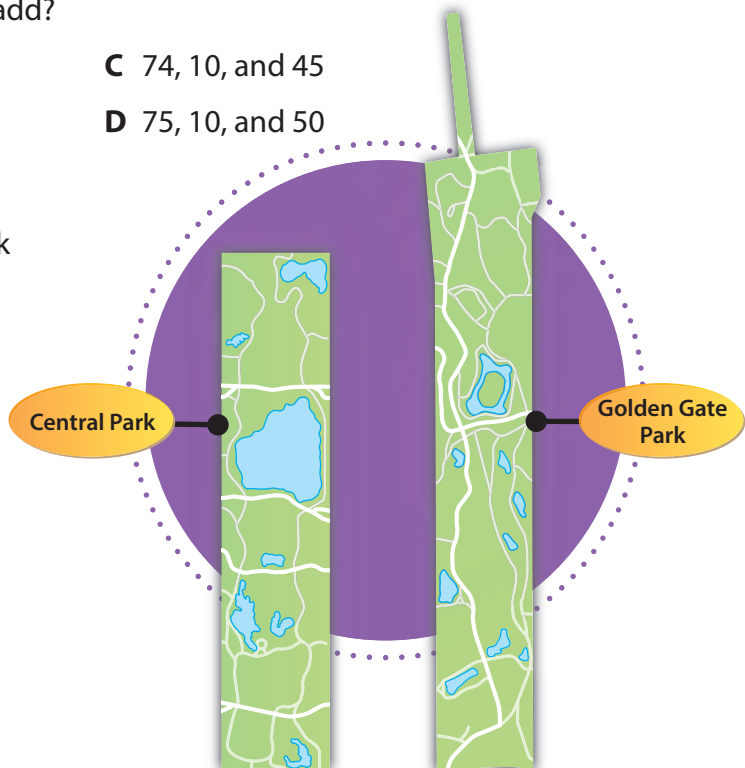
Algebra Connections

Number Patterns

The following numbers form a pattern.

3, 7, 11, 15, 19, …

In this case the pattern is a simple one. The pattern is add 4.

Some patterns are more complicated. Look at the following pattern.

20, 24, 30, 34, 40, 44, 50, …

In this case, the pattern is add 4, add 6.

Example:

What are the next two numbers in the pattern?

24, 29, 28, 33, 32, 37, 36, …

Think The first number is increased by 5. The next number is decreased by 1. I see that the pattern continues.

24, 29, 28, 33, 32, 37, 36, …
+5 −1 +5 −1 +5 −1

To find the next two numbers, add 5, and then subtract 1. The next two numbers are 41 and 40.

Look for a pattern. Find the next two numbers.

1. 9, 18, 27, 36, 45, …

2. 90, 80, 70, 60, 50, …

3. 2, 102, 202, 302, …

4. 26, 46, 66 , 86, …

5. 20, 31, 42, 53, 64, …

6. 100, 92, 84, 76, 68, …

7. 1, 3, 9, 27, …

8. 800, 400, 200, 100, …

9. 20, 21, 19, 20, 18, 19, 17, …

10. 10, 11, 21, 22, 32, 33, …

11. 25, 32, 28, 35, 31, 38, …

12. 5, 15, 10, 20, 15, 25, 20, …

· ·

13. The following numbers are called Fibonacci numbers.

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, …

Explain how you could find the next two numbers.

14. **Write a Problem** Write a number pattern that involves two operations.

Adding and Subtracting

How can you add and subtract whole numbers?

What was the total number of motor vehicles made in the United States and Japan in one year?

Choose an Operation

Add to join groups.

Find 11,989,387 + 10,511,518.

Estimate:

12,000,000 + 11,000,000 = 23,000,000

Country	Number of motor vehicles produced in one year
United States	11,989,387
Japan	10,511,518
Germany	5,569,954

Another Example **How can you subtract across zeros?**

Find 5,002 − 2,684. Since addition and subtraction have an inverse relationship, check your subtraction by adding.

Step 1

Subtract the ones. Think of 5,000 as 500 tens. Regroup.

$$\begin{array}{r} \overset{4\ \ 9\ \ 9\ \ 12}{5,\,0\,0\,2} \\ -\ 2,\,6\,8\,4 \\ \hline 8 \end{array}$$

Step 2

Subtract the tens, hundreds, and thousands.

$$\begin{array}{r} \overset{4\ \ 9\ \ 9\ \ 12}{5,\,0\,0\,2} \\ -\ 2,\,6\,8\,4 \\ \hline 2,\,3\,1\,8 \end{array}$$

Check

Add the difference to the number you subtracted. The answer checks.

$$\begin{array}{r} 2,\,3\,1\,8 \\ +\ 2,\,6\,8\,4 \\ \hline 5,\,0\,0\,2 \end{array}$$

Explain It

1. Explain the regrouping in Step 1 of the subtraction example above.

2. Why can you check a subtraction problem by adding?

Line up numbers by place value.
Add the ones, tens, and hundreds.

$$
\begin{array}{r}
\overset{1\,1}{} \\
11,989,387 \\
+\ \ 10,511,518 \\
\hline
905
\end{array}
$$

Continue adding. Regroup if needed. Insert commas in the sum to separate periods.

$$
\begin{array}{r}
\overset{1\,1\,1\ \ \,1\,1}{} \\
11,989,387 \\
+\ \ 10,511,518 \\
\hline
22,500,905
\end{array}
$$

The sum is reasonable since the estimate was 23,000,000.

In one year a total of 22,500,905 vehicles were made.

Guided Practice*

Do you know HOW?

Add.

1. 5,741 + 31,018

2. 7,110 + 499

Subtract.

3. 9,234 − 2,387

4. 110,652 − 8,600

Do you UNDERSTAND?

5. Writing to Explain In Step 2 of the example above, explain how you regrouped the tens place.

6. In the example above, how many cars did the United States and Germany make altogether?

Independent Practice

In **7** through **12**, add.

7. 7,469 + 8,374

8. 19,335 + 24,281

9. 40,742 + 22,597

10. 102,369 + 60,320

11. 18,269 + 109,347

12. 75,977 + 24,683

In **13** through **18**, subtract. Check your answer by adding.

13. 4,002 − 3,765

14. 58,005 − 1,098

15. 113,300 − 1,774

16. 454,900 − 33,870

17. 31,483 − 29,785

18. 103,558 − 64,671

19. Reasoning Why should you estimate before you find the sum or difference of large numbers?

20. About 66,150,000 households in the U.S. have cats and about 58,200,000 households have dogs. About how many more households have cats than dogs?

21. Write a Problem Use 1,400 and 986 to write a real-world addition problem.

22. Humans are born with 350 bones. Some of these bones fuse together as humans grow. Adults only have 206 bones. How many more bones does a baby have than an adult?

350 bones	
?	206

23. Find each sum and difference. Write >, <, or = for each ◯.

a 1,233 + 486 ◯ 2,200 − 481   **c** 544 + 4,732 ◯ 2,512 + 1,930

b 193 + 233 ◯ 309 + 118   **d** 9,491 − 6,230 ◯ 7,020 − 3,759

The table at the right shows the amount of time (rounded to the nearest hour) that astronauts have spent in space for several space programs.

24. For the five space programs listed, what is the total number of hours astronauts spent in space?

A 14,608 hours   **C** 19,988 hours

B 17,621 hours   **D** 20,038 hours

Program	Years	Total Hours
Mercury	1961–1963	54
Gemini	1965–1966	970
Apollo	1968–1972	2,502
Skylab	1973–1974	4,105
Space Shuttle	1981–1995	12,407

25. How much longer did astronauts in the Space Shuttle program spend in space than all of the other programs combined?

A 631 hours   **C** 4,776 hours

B 2,194 hours   **D** 12,407 hours

26. Lisa has a basket of 17 tomatoes. She makes sauce with 9 tomatoes. If Lisa wants to split up the rest between 3 friends and herself, how many tomatoes does each person get?

27. There are about 44,000 farms in Florida and about 38,000 farms in New York. Are the total number of estimated farms in Florida and New York greater or less than 100,000?

Find each sum. Estimate to check if the answer is reasonable.

1.	5,542 + 7,381	**2.**	63,805 + 6,597	**3.**	7,469 + 857	**4.**	36,247 + 93,312
5.	75,338 + 25,664	**6.**	16,490 + 3,523	**7.**	56,080 + 3,920	**8.**	1,125 + 687

Find each difference. Estimate to check if the answer is reasonable.

9.	291 − 140	**10.**	9,017 − 939	**11.**	7,738 − 5,748	**12.**	44,233 − 16,375	**13.**	11,111 − 582
14.	36,538 − 14,279	**15.**	2,010 − 1,355	**16.**	25,000 − 6,117	**17.**	76,391 − 68	**18.**	4,317 − 1,718

Error Search Find each sum or difference that is not correct.
Write it correctly and explain the error.

19.	13,643 + 267 13,810	**20.**	56,682 + 39,058 95,740	**21.**	75,350 + 8,926 84,176	**22.**	56,004 − 486 55,518	**23.**	27,033 − 15,834 12,199

Number Sense

Estimating and Reasoning Write whether each statement is
true or false. Explain your reasoning.

24. The difference of 32,076 and 21,894 is closer to 10,000 than 11,000.

25. The sum of 10,323 and 9,769 is greater than 19,000 but less than 21,000.

26. The sum of 8,242 and 4,031 is less than 12,000.

27. The difference of 6,712 − 3,503 is 3 more than 3,212.

28. The sum of 405 + 319 is 5 more than 719.

29. The difference of 8,764 − 1,843 is greater than 8,000.

Adding Decimals

How can you add decimals?

What was the combined time for the first two legs of the relay race?

Swimmers	Times in Seconds
Caleb	21.49
Bradley	21.59
Vick	20.35
Matthew	19.03

Choose an Operation Add to join groups.

Find 21.49 + 21.59.

Estimate: 21 + 22 = 43

Guided Practice*

Do you know HOW?

In **1** through **6**, add the decimals.

1. 0.82 + 4.21   **2.** 9.1 + 7.21

3. 9.7 + 0.24   **4.** 3.28 + 6.09

5. 0.26 + 8.3   **6.** 4.98 + 3.02

Do you UNDERSTAND?

7. Reasonableness How do you know the total time for the first two legs of the race is reasonable?

8. Writing to Explain How is finding $4.25 + $3.50 like finding 4.25 + 3.5? How is it different?

Independent Practice

In **9** through **26**, add the decimals.

9.   1.03
    + 0.36

10.   6.9
    + 2.8

11.   45.09
    + 2.005

12.   2.02
    + 0.78

13.   13.094
    + 4.903

14.   356.2
    + 12.45

15.   4.298
    + 0.65

16.   9.001
    + 1.999

17. $8.23
    + $64.10

18. $44.00
    + $91.46

19.   17.49
    + 9

20.   42.89
    + 8.2

21. $271.90 + $34.22

22. 658.2 + 0

23. 0.922 + 6.4

24. 8.02 + 9.07

25. 13.9 + 0.16

26. 0.868 + 15.973

*For another example, see Set E on page 49.

Step 1

Write the numbers. Line up the decimal points.

$$\begin{array}{r} 21.49 \\ +\ 21.59 \\ \hline \end{array}$$

Step 2

First, add the hundredths. Regroup if necessary.

$$\begin{array}{r} {\scriptstyle 1} \\ 21.49 \\ +\ 21.59 \\ \hline 8 \end{array}$$

Step 3

Add the tenths, ones, and tens. The decimal point in the sum is aligned with the decimal point in the addends. Check the sum with your estimate.

$$\begin{array}{r} {\scriptstyle 1\ \ 1} \\ 21.49 \\ +\ 21.59 \\ \hline 43.08 \end{array}$$

The total time for the first two legs of the race was 43.08 seconds.

Problem Solving

27. A balloon mural of the Chicago skyline measures 17.6 m on two sides and 26.21 m on the other two sides. What is the perimeter of the mural?

A 38.81 m   **B** 48.21 m   **C** 55.74 m   **D** 87.62 m

28. Writing to Explain Juan adds 3.8 + 4.6 and gets a sum of 84. Is his answer correct? Tell how you know.

29. Think About the Process Jamie earned $27 taking care of a neighbor's dog for one week. She spent $19.95 on a new DVD. Later, she earned $15 for raking leaves. Which expression shows how to find the money Jamie has left?

A $27 + $19.95 + $15   **C** $27 − $19.95 + $15

B $19.95 − $15 + $27   **D** $27 − $19.95 − $15

30. At a flower shop, Teri sees that roses are $3 each, carnations are $4 for 3 flowers, and tulips are $4 for 4 flowers. She buys 3 roses and 3 carnations. She has $20. How much change does Teri get back?

31. Which two cities had the greatest combined rainfall for the period given?

A Caribou and Boise

B Springfield and Macon

C Macon and Boise

D Caribou and Springfield

Location	Rainfall amount in a typical year (in inches)
Macon, GA	45
Boise, ID	12.19
Caribou, ME	37.44
Springfield, MO	44.97

32. What is the typical yearly rainfall for all four cities?

33. Which location had less than 45 inches of rain but more than 40 inches of rain?

Subtracting Decimals

How can you subtract decimals?

What is the difference in the wingspans of the two butterflies?

4.37 cm

5.92 cm

Choose an Operation

Subtract to find the difference.

Find $5.92 - 4.37$.

Estimate: $6 - 4 = 2$
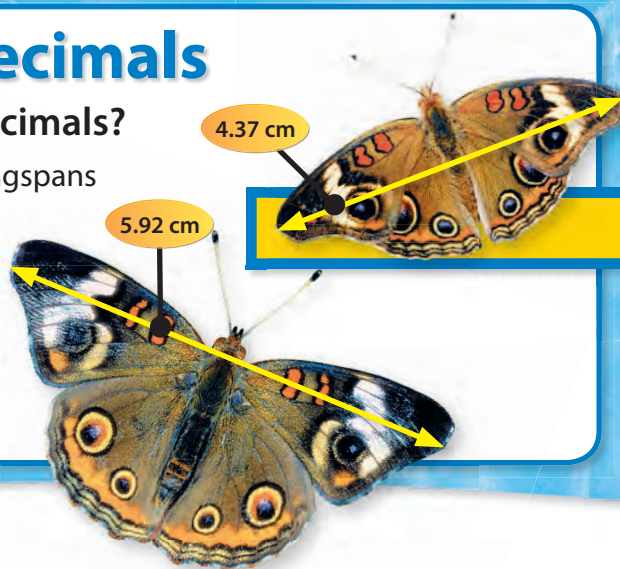
Other Examples

Using 0 as a placeholder

Find $49.59 - 7.9$.

$$
\begin{array}{r}
4\overset{8}{\cancel{9}}.\overset{15}{\cancel{5}}9 \\
-\ \ 7.9\,0 \\
\hline
4\,1.6\,9
\end{array}
$$

Annex a 0 as a placeholder to show hundredths.

Using 0 as a placeholder

Find $24.6 - 8.27$.

$$
\begin{array}{r}
\overset{1}{\cancel{2}}\overset{14}{\cancel{4}}.\overset{5}{\cancel{6}}\overset{10}{\cancel{0}} \\
-\ \ 8.27 \\
\hline
1\,6.3\,3
\end{array}
$$

Annex a 0 as a placeholder to show hundredths.

Subtracting Money

Find $\$26.32 - \$5.75$.

$$
\begin{array}{r}
\$2\overset{5}{\cancel{6}}.\overset{\overset{12}{\cancel{2}}}{\cancel{3}}\overset{12}{\cancel{2}} \\
-\ \ 5.7\,5 \\
\hline
\$2\,0.5\,7
\end{array}
$$

Guided Practice*

Do you know HOW?

In **1** through **8**, subtract the decimals.

1. $\begin{array}{r} 16.82 \\ -\ \ 5.21 \\ \hline \end{array}$

2. $\begin{array}{r} 7.21 \\ -\ \ 6.1 \\ \hline \end{array}$

3. $\begin{array}{r} 23.06 \\ -\ \ 8.24 \\ \hline \end{array}$

4. $\begin{array}{r} \$4.08 \\ -\ \$2.12 \\ \hline \end{array}$

5. $56.8 - 2.765$

6. $\$43.80 - \$16.00$

7. $22.4 - 10.7$

8. $\$36.40 - \$21.16$

Do you UNDERSTAND?

9. **Reasonableness** Explain why 1.55 cm is a reasonable answer for the difference in the wingspans of the two butterflies.

10. In the Other Examples above, is the value of 7.9 changed when you annex a zero after 7.9? Why or why not?

11. **Writing to Explain** How is finding $9.12 - 4.8$ similar to finding $\$9.12 - \$4.80$? How is it different?

For another example, see Set E on page 49.

Step 1

Write the numbers, lining up the decimal points.

$$\begin{array}{r} 5.9\,2 \\ -\ 4.3\,7 \\ \hline \end{array}$$

Step 2

Subtract the hundredths. Regroup if needed.

$$\begin{array}{r} {}^{8}\ {}^{12} \\ 5.\,\cancel{9}\ \cancel{2} \\ -\ 4.3\,7 \\ \hline 5 \end{array}$$

Step 3

Subtract the tenths and ones. Bring down the decimal point.

$$\begin{array}{r} {}^{8}\ {}^{12} \\ 5.\,\cancel{9}\ \cancel{2} \\ -\ 4.3\,7 \\ \hline 1.5\,5 \end{array}$$

The difference is reasonable since the estimate was 2.

The difference in the wingspans is 1.55 cm.

Independent Practice

In **12** through **23**, subtract to find the difference.

12.
$$\begin{array}{r} 7.8 \\ -\ 4.9 \\ \hline \end{array}$$

13.
$$\begin{array}{r} \$20.60 \\ -\ \$14.35 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 43.905 \\ -\ 7.526 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 65.29 \\ -\ 28.038 \\ \hline \end{array}$$

16. $15.03 - 4.121$

17. $13.9 - 3.8$

18. $65.18 - 12.005$

19. $\$52.02 - \$0.83$

20. $7.094 - 3.657$

21. $34.49 - 12.619$

22. $85.22 - 43.548$

23. $\$10.05 - \$4.50$

Problem Solving

24. Writing to Explain Why is it necessary to line up decimal points when subtracting decimals?

25. Reasonableness Sue subtracted 2.9 from 20.9 and got 1.8. Explain why this is not reasonable.

26. The pyramid of Khafre measured 143.5 meters high. The pyramid of Menkaure measured 65.5 meters high. What was the difference in the heights of these two pyramids?

A 68.8 meters

B 69.3 meters

C 78 meters

D 212.3 meters

27. An average person's upper leg measures 19.88 in. and the lower leg measures 16.94 in. How much longer is the upper leg than the lower leg?

19.88 in.

?	16.94 in.

Menkaure 65.5 meters high
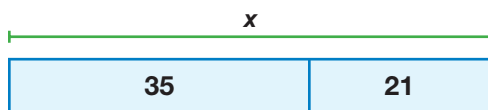
Khafre 143.5 meters high

Problem Solving

Draw a Picture and Write an Equation

Three friends have music collections. How many more CDs does Susan have than Larry?

Music Collections

	Number of CDs
Susan	42
Chad	17
Larry	26

Another Example

Rori had some balloons and then gave 35 of them away. She now has 21 left. How many balloons did Rori have to begin with?

x	
35	21

One Way

Think The total is unknown.

35 were given away and 21 are left.

Write an Equation

$x - 35 = 21$

$21 + 35 = 56$, so 56 is the total.

$x = 56$

Another Way

Think 35 were given away. Rori has 21 left.

The total is unknown.

Write an Equation

$35 + 21 = x$

$35 + 21 = 56$, so 56 is the total.

$x = 56$

Rori had 56 balloons to begin with.

Explain It

1. Why do both ways use addition to solve for x?

2. How can you check if 56 is a reasonable answer?

What do I know?
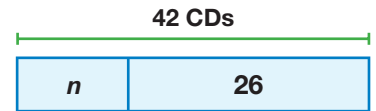
Susan has 42 CDs and Larry has 26 CDs.

What am I asked to find?

The difference between the number of CDs from these two collections.

Draw a Picture

42 CDs

n	26

Write an Equation

Let n = the number of additional CDs Susan has.

$42 - 26 = n$

$$\begin{array}{r} \overset{3}{\cancel{4}}\overset{1}{2} \\ -\ 2\ 6 \\ \hline 1\ 6 \end{array}$$

Susan has 16 more CDs in her collection than Larry.

Guided Practice*

Do you know HOW?

Draw a picture and write an equation. Solve.

1. Alec prints digital photos at a camera store. The first order was for 24 prints. The second order was for 85 prints, and the third for 60 prints. How many fewer prints were in the first order than the third order?

Do you UNDERSTAND?

2. What phrase from the above example gives you a clue that you will use subtraction in your drawing to solve the problem?

3. **Write a Problem** Write a real-world problem that uses subtraction and can be solved by drawing a picture and writing an equation.

Independent Practice

In **4**, copy and complete the picture. Then write an equation and solve.

4. Rose needs 22 tacos for a party. She has made 12 tacos so far. How many more tacos does Rose need to make?

	12

In **5**, draw a picture, write an equation in two different ways, then solve.

5. Aryanna is planning to spend a certain number of days on a trip to Florida. If she plans to spend 5 of the days in Orlando, she'll have 16 more days for the rest of her vacation. How many days does Aryanna plan to spend in Florida?

Stuck? Try this....

- What do I know?
- What am I asked to find?
- What diagram can I use to help understand the problem?
- Can I use addition, subtraction, multiplication, or division?
- Is all of my work correct?
- Did I answer the right question?
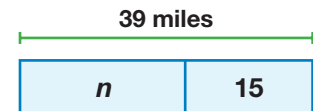- Is my answer reasonable?

*For another example, see Set F on page 49.

In **6**, use the bar graph at the right.

6. Foster Middle School raised money to help care for some endangered animals. The bar graph shows the number of animals they will help with the money raised.

Endangered Animals to Help

a How many sea turtles and snow leopards can they help?

b What is the difference between the greatest number of animals to be helped and the least number to be helped?

c Show how you can use mental math to find the total number of animals helped.
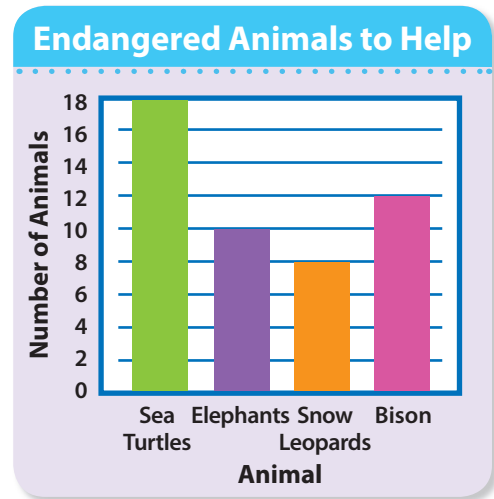
7. **Writing to Explain** Don is adding 407 and 512. How do you know his sum will be less than 1,000?

8. **Writing to Explain** Is 1,200 a good estimate for the difference of 4,725 − 2,689? Explain.

9. A planetarium is 39 miles from Marco's school. The class leaves for the field trip at 8:00 A.M. After driving for 17 minutes and traveling 15 miles, the driver of the bus got caught in traffic. How many more miles are left to travel to the planetarium? Write an equation to solve.

39 miles	
n	15

10. Marlee is taking a class to improve her reading. She began reading a book on Monday and completed 3 pages. Tuesday she read 6 pages, Wednesday, 12 pages. If this pattern continues, how many pages will Marlee read on Friday?

Think About the Process

11. Three fifth-grade classes took a survey and found that 35 students take the bus to school, 25 come by car, 15 walk, and 5 ride their bikes. Which shows how to find how many more students take the bus than walk?

A Subtract 35 from 5

B Subtract 15 from 35

C Add 15 and 35

D Add 35 and 5

12. Darcy brought home 43 seashells from his vacation. Rich brought home *x* shells. Together they brought home 116 seashells. Which equation can you solve to find the number of shells Rich brought home?

A $43 + x = 116$

B $116 + x = 43$

C $116 + 43 = x$

D $x - 43 = 116$

Find each difference. Estimate to check if the answer is reasonable.

1. 133.06
   + 79.19

2. 85.19
   + 76.82

3. 43.9
   + 17.36

4. 0.658
   + 0.178

5. 0.375
   + 0.92

6. 1.63
   + 0.074

7. 724.16
   + 3.38

8. 13.92
   + 46.3

Find each difference. Estimate to check if the answer is reasonable.

9. 354.1
   − 15.8

10. 485.3
   − 117.5

11. 64.06
   − 15.83

12. 47.6
   − 1.53

13. 562.8
   − 48.2

14. 1.17 − 0.362

15. 4.9 − 1.003

16. 6.73 − 4.816

Error Search Find each sum or difference that is not correct.
Write it correctly and explain the error.

17. 27.02
   + 19.89
   ───────
   46.81

18. 655.35
   + 25.60
   ───────
   680.95

19. 4.58
   + 13.59
   ───────
   18.16

20. 2.05
   − 1.831
   ───────
   0.221

21. 219.2
   − 61.3
   ───────
   157.9

Number Sense

Estimating and Reasoning Write whether each statement is true or false. Explain your reasoning.

22. The sum of 56,141 and 3,052 is less than 59,000.

23. The sum of 50.73 and 40.22 is greater than 90 but less than 92.

24. The difference of 63,432 and 21,089 is greater than 41,000 and less than 43,000.

25. The difference of 3,762 − 1,413 is 13 more than 2,362.

26. The sum of 26.96 + 32.25 is 0.04 less than 59.25.

27. The difference of 56.13 and 12.95 is closer to 44 than 43.

1. The Chen family's home has 1,515 square feet downstairs and 625 square feet upstairs. Which of the following is the best estimate of the total square footage in the home? (2-3)

A 2,100

B 2,200

C 2,300

D 2,500

2. What is 2.934 rounded to the nearest hundredth? (2-2)

A 2.90

B 2.93

C 2.94

D 3.00

3. Eduardo is training for a marathon. He ran his first mile in 12.567 minutes and his second mile in 12.977 minutes. What is his combined time for the first two miles? (2-5)

A 24.434 minutes

B 24.544 minutes

C 25.444 minutes

D 25.544 minutes

4. To add 18 + 25 using mental math, Braxton did the following. What is the missing number that makes the statement true? (2-1)

$18 + 25 = 18 + (2 + 23) = (18 + \boxed{}) + 23$

A 43

B 25

C 20

D 2

5. Which two trails combined are less than 4 miles? Use estimation to decide. (2-3)

Trails	Red	Blue	Yellow	Green
Miles	2.75	3.5	2.95	1.2

A Red and Yellow

B Blue and Green

C Red and Green

D Blue and Yellow

6. The Thomas Jefferson Memorial is on 18.36 acres of land and the Franklin Delano Roosevelt Memorial is on 7.5 acres of land. How many more acres of land is the Jefferson Memorial on than the Roosevelt memorial? (2-6)

A 9.86

B 10.86

C 11.31

D 17.61

7. The table shows the areas of two islands. How many more square miles is the area of Greenland than the area of New Guinea? (2-4)

Island	Area (square miles)
Greenland	839,999
New Guinea	316,615

A 1,156,614

B 1,145,504

C 587,716

D 523,384

8. In 2005, there were 2,100,990 farms in the United States. Which of the following is 2,100,990 rounded to the nearest thousand? (2-2)

A 2,101,100

B 2,101,000

C 2,100,900

D 2,100,000

9. Which picture represents the problem? Parson's Sporting Goods ordered 56 T-shirts in sizes small, medium and large. If 23 T-shirts are medium and 12 T-shirts are large, how many are small? (2-7)

A
56 shirts in all

| 23 | 12 | ? |

B
? shirts in all

| 23 | 12 | 56 |

C
56

| 23 | ? |

D
56 + ?

| 23 | 12 |
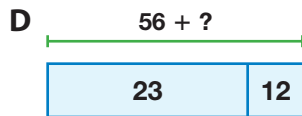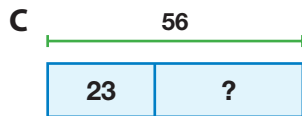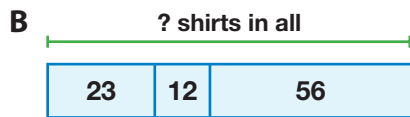
10. A lecture hall has 479 desk chairs and 216 folding chairs. How many seats are there in all? Use mental math to solve. (2-1)

A 615

B 685

C 695

D 785

11. Parker had a batting average of 0.287 and Keenan had an average of 0.301. How much higher was Keenan's batting average than Parker's? (2-6)

A 0.256

B 0.14

C 0.023

D 0.014

12. April logged the miles she rode on her bicycle in the table shown. Which is the best estimate of the total miles April rode during the first two weeks? (2-3)

Week	1	2	3	4	5
Miles	12.3	7.8	6.2	11.8	9.5

A 19

B 20

C 26

D 38

13. What is 87.25 + 7.69? (2-5)

A 79.56

B 94.2569

C 94.94

D 95.94

14. In the 2004 Presidential Election, 62,040,610 people voted for George W. Bush and 59,028,439 people voted for John F. Kerry. What was the total number of votes for the two men? (2-4)

A 121,069,049

B 121,068,049

C 111,069,049

D 121,169,049

Set A, pages 24–26

Add 53 + 11 + 7 using mental math.

53 and 7 are compatible numbers, and the Commutative Property of Addition allows you to add in any order.

53 + 11 + 7 = 53 + 7 + 11
$\qquad\qquad$ = 60 + 11
$\qquad\qquad$ = 71

Remember that you can use compatible numbers or compensation to find sums and differences.

1. 67 + 28 $\qquad$ **2.** 130 + 470

3. 35 + 14 + 6 $\qquad$ **4.** 276 − 99

5. 96 + 234 + 4

Set B, pages 28–29

Round 12.0**87** to the underlined place.

12.08**7** $\quad$ Look at the digit following the underlined digit. Look at **7**.

$\qquad\qquad$ Round the 8 to the next higher digit because **7 > 5**.

12.087 is about 12.09.

Remember that rounding a number means replacing it with another number that tells about how much or how many.

1. 10.2**4**5 $\qquad$ **2.** 9.1**4**5

3. 67,**9**01 $\qquad$ **4.** **9**9,102

Set C, pages 30–32

Estimate 19.9 + 17.03

$\begin{array}{r} 19.9 \longrightarrow 20 \\ 17.03 \longrightarrow +\ 17 \\ \hline 37 \end{array}$ $\quad$ Round to the nearest whole number.

19.9 + 17.03 is about 37.

Remember that you can also use compatible numbers to estimate.

1. 76 + 23 $\qquad$ **2.** 15.01 − 4.4

3. 8,001 + 2,890 $\quad$ **4.** 25,003 − 12,900

Set D, pages 34–36

Find 6,259 − 2,488.

Estimate: 6,000 − 2,000 = 4,000.

Subtract each place, starting from the right.

$\begin{array}{r} \overset{\overset{11}{}}{\overset{5\ \ \cancel{1}\ \ 15}{\cancel{6},\ \cancel{2}\ \cancel{5}\ 9}} \\ -\ 2,\ 4\ 8\ 8 \\ \hline 3,\ 7\ 7\ 1 \end{array}$ $\quad$ Check: $\quad \begin{array}{r} \overset{1\ \ \ \ 1}{3,\ 7\ 7\ 1} \\ +\ 2,\ 4\ 8\ 8 \\ \hline 6,\ 2\ 5\ 9 \end{array}$

The answer 3,771 is reasonable because it is close to the estimate.

Remember to first estimate and then check that your answer is reasonable.

1. $\quad\begin{array}{r} 9,371 \\ +\ 6,059 \\ \hline \end{array}$ $\quad$ **2.** $\quad\begin{array}{r} 14,506 \\ -\ 8,759 \\ \hline \end{array}$

3. $\quad\begin{array}{r} 41,974 \\ +32,821 \\ \hline \end{array}$ $\quad$ **4.** $\quad\begin{array}{r} 178,312 \\ -140,987 \\ \hline \end{array}$

5. 72,555 + 38,055

Set E, pages 38–41

Find 7.83 − 3.147.

Estimate: 8 − 3 = 5.

Step 1

Write the numbers. Line up the decimal points. Annex zeros to show place value.

Step 2

Subtract as you would whole numbers. Bring the decimal point straight down in the answer.

Step 3

Check your answer by adding. The answer checks.

$$
\begin{array}{r}
7.\;8\;3\;\textcolor{red}{0} \\
-\;3.\;1\;4\;7 \\
\hline
\end{array}
\qquad
\begin{array}{r}
{\scriptstyle 7\;\;12\;10} \\
7.\;8\;3\;\cancel{0} \\
-\;3.\;1\;4\;7 \\
\hline
4.\;6\;8\;3
\end{array}
\qquad
\begin{array}{r}
{\scriptstyle 1\;\;\;1} \\
4.\;6\;8\;3 \\
+\;3.\;1\;4\;7 \\
\hline
7.\;8\;3\;0
\end{array}
$$

The difference is reasonable because 4.683 is close to the estimate of 5.

Remember to line up the decimal points before you add or subtract.

1. 3.77 + 4.66   **2.** 12.68 + 31.919

3. 6.142 + 1.322   **4.** 67.8 + 14.755

5. 7.029 + 48.7   **6.** 10.93 + 0.967

7. 9.21 − 1.72   **8.** 15.51 − 11.302

9. 5.7 − 0.623   **10.** 16.209 − 14.5

11. 17.099 − 9.7   **12.** 81.12 − 37.202

Set F, pages 42–44

Steve exercises 910 minutes a week in the summer. This is 190 minutes more than he exercises each week during the school year. How many minutes a week does he exercise during the school year?

Draw a bar diagram to show the main idea.

910 minutes	
m	190 min
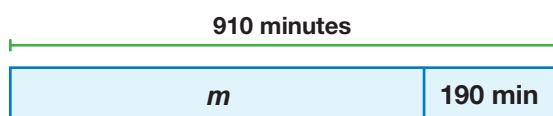
Let *m* = minutes per week of exercise during the school year.

$910 - 190 = m$
$m = 720$

$$
\begin{array}{r}
910 \\
-\;190 \\
\hline
720
\end{array}
$$

Martin exercises 720 minutes a week during the school year.

Remember that drawing a picture can help you before writing an equation to solve a problem.

Draw a picture and write an equation. Solve.

1. Jay's parents celebrated their 25th wedding anniversary in 2005. In what year did they get married?

2. One football stadium, built in 1982, has 64,035 seats. Another stadium, built in 1987, has 74,916 seats. How many more seats does the newer stadium have?

3. The two fifth-grade classes at school are having a fundraiser. The first class raised $2,187. Both classes raised $4,136 together. How much did the second class raise?