

Section 1.3 Adding and Subtracting Whole Numbers

Objectives

In this section you will learn to:

- Add whole numbers.
- Find the perimeter of a geometric figure.
- Subtract whole numbers.

To successfully complete this section, you need to understand:

- Place value (1.1)
- The Associative Property (1.2)
- The Commutative Property (1.2)
- Adding by grouping to 10 (1.2)

INTRODUCTION

You have been adding numbers since you were young, and it's possible you've had an easy time of it. It's also possible that there are certain facts about addition that still puzzle you.

It is the purpose of this section to explain the ideas behind addition and subtraction so that they are less of a mystery. The technique from Section 1.1 of thinking of addition in terms of money will come in handy here.

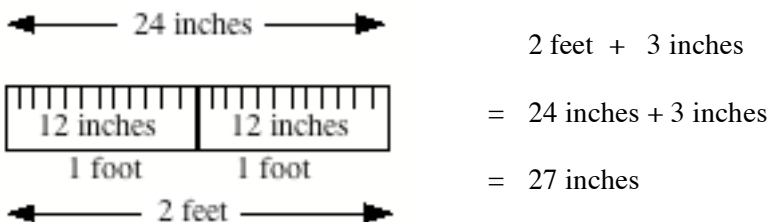
It's also important to know that to add two numbers, the numbers must represent an amount or quantity of the same item. For example,

we know that $2 \text{ feet} + 3 \text{ feet} = 5 \text{ feet}$
and that $2 \text{ inches} + 3 \text{ inches} = 5 \text{ inches}$
but $2 \text{ feet} + 3 \text{ inches}$ is not 5 of anything.

Units of Measure

Feet and inches are called *units of measure*. They are standard lengths.

To add 2 feet and 3 inches as a single unit of measure, we must first rewrite one of the measures—let's choose feet—in terms of the other measure, inches. In this case, you might know that 2 feet is equivalent to 24 inches (as shown in the diagram below), so



If we were to add two such measures, such as 2 feet 3 inches + 6 feet 4 inches, we would be smart to add the feet together and, separately, add the inches together:

$$\begin{array}{r} 2 \text{ feet } 3 \text{ inches} \\ + 6 \text{ feet } 4 \text{ inches} \\ \hline 8 \text{ feet } 7 \text{ inches} \end{array}$$

ADDING WHOLE NUMBERS

Now let's consider place value in finding the sum of two numbers. For example,

$$\text{we know that } 2 \text{ ones} + 3 \text{ ones} = 5 \text{ ones}$$

$$\text{and that } 2 \text{ tens} + 3 \text{ tens} = 5 \text{ tens}$$

$$\text{but } 2 \text{ tens} + 3 \text{ ones} \text{ is not 5 of anything.}$$

Just as in adding feet and inches, we can combine tens and ones as long as they are represented by the same place value.

$$\begin{aligned} & 2 \text{ tens} + 3 \text{ ones} \\ &= 20 \text{ ones} + 3 \text{ ones} \\ &= 23 \text{ ones} \end{aligned}$$

Furthermore, we can keep the numbers in terms of both tens and ones and combine them with other two-digit numbers:

$$\begin{array}{r} 2 \text{ tens} \quad 3 \text{ ones} \quad (\text{or } 23) \\ + 6 \text{ tens} \quad 4 \text{ ones} \quad (\text{or } 64) \\ \hline 8 \text{ tens} \quad 7 \text{ ones} \quad (\text{or } 87) \end{array}$$

This idea suggests that when adding two numbers, such as 23 and 64, we must add the tens with the tens and the ones with the ones. Typically, we write the numbers *vertically*, one number directly above the other, aligning the tens and ones places from each number. In doing so we create two columns of numbers, a ones column and a tens column:

$$\begin{array}{r} 23 \\ + 64 \\ \hline 87 \end{array}$$

Example 1: Add each pair of numbers.

$$\text{a) } 34 + 53 \quad \text{b) } 27 + 41 \quad \text{c) } 175 + 304 \quad \text{d) } 507 + 291$$

Procedure: Align the numbers vertically so that one number is directly above the other; make sure the ones place is above the ones place, tens place above tens place, and so on.

$$\begin{array}{r} \text{Answer:} \quad \text{a) } \begin{array}{r} 34 \\ + 53 \\ \hline 87 \end{array} \quad \text{b) } \begin{array}{r} 27 \\ + 41 \\ \hline 68 \end{array} \quad \text{c) } \begin{array}{r} 175 \\ + 304 \\ \hline 479 \end{array} \quad \text{d) } \begin{array}{r} 507 \\ + 291 \\ \hline 798 \end{array} \end{array}$$

The numbers in each pair in Example 1 have the same number of digits. It's also possible to add a two-digit number to a three or four-digit number, and so on. To make sure that the place values align with each other, we can place extra zeros in front of one of the numbers to make all have the same number of places, as illustrated in Example 2.

Example 2: Add each pair of numbers.

a) $324 + 53$ b) $31 + 914$ c) $2,457 + 421$ d) $1,075 + 12$

Procedure: Although it's not necessary, it may be helpful to place one or more zeros in front of the smaller number so that it has the same number of places as the larger number.

Answer:

a) $\begin{array}{r} 324 \\ + 53 \\ \hline 377 \end{array}$	b) $\begin{array}{r} 031 \\ + 914 \\ \hline 945 \end{array}$	c) $\begin{array}{r} 2457 \\ + 0421 \\ \hline 2,878 \end{array}$	d) $\begin{array}{r} 1075 \\ + 0012 \\ \hline 1,087 \end{array}$
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YTI #1

Add. Use Examples 1 and 2 as guides. (These are already aligned, but you may want to place some zeros in front of one number or the other.)

a) $\begin{array}{r} 157 \\ + 230 \\ \hline \end{array}$	b) $\begin{array}{r} 2,754 \\ + 1,121 \\ \hline \end{array}$	c) $\begin{array}{r} 133 \\ + 4,426 \\ \hline \end{array}$	d) $\begin{array}{r} 135,604 \\ + 2,261 \\ \hline \end{array}$
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ADDITION BY CARRYING NUMBERS OVER

You probably noticed that none of the sums in YTI #1 was more than 9 in any place. The problems were carefully chosen so you could add directly without having to worry about *carryover*.

Let's consider what would happen if two of the digits add to 10 or more.

In Section 1.2 we saw, and explored why, $6 + 7 = 13$. Written vertically, this looks like:

addend	6	
<u>+ addend</u>	<u>+ 7</u>	
sum	13	(13 is 1 ten and 3 ones)

What's especially important to recognize is that the sum includes another place value that wasn't in either addend. In other words, though both 6 and 7 are in the ones place, we get a sum that extends itself into the tens place.

If we add, for example, $26 + 57$, the extra ten that we get from $6 + 7$ must be figured into the sum. Here's the long way to look at it:

26	→	2 tens and 6 ones
<u>+ 57</u>	→	<u>+ 5 tens and 7 ones</u>
		7 tens and 13 ones

Because 13 ones can be rewritten as 1 ten and 3 ones, this answer becomes

$$= \underline{7 \text{ tens and } 1 \text{ ten}} \text{ and } 3 \text{ ones} = 70 + 13$$

$$= 8 \text{ tens and } 3 \text{ ones} = 80 + 3 = 83$$

The short way to find this sum is to show that extra 10 (from the 13) in the tens column. In other words, the 13 we get from 6 and 7 needs to be recognized as being 1 ten and 3 ones. This way, the 3 ones can stay in the ones place and the 1 ten can move to the tens column. This is called **carrying over**; the 1 ten is a *carryover* into the next column of numbers, the tens column.

Example 3: Add 26 and 57. Follow the steps outlined here.

A. Starting with the ones column, $6 + 7 = 13$:

$$\begin{array}{r} \text{Start here} \\ \downarrow \\ 26 \\ + 57 \\ \hline 6 + 7 = 13 \end{array}$$

B. Carry the **1 ten** into the tens column

$$\begin{array}{r} (1 \text{ ten and } 3 \text{ ones}) \\ \swarrow \quad \searrow \\ 1 \text{ ten} \quad \rightarrow \quad 1 \\ \text{and } 3 \text{ ones} \quad \rightarrow \quad 26 \\ \phantom{1 \text{ ten}} \quad \rightarrow \quad + 57 \\ \phantom{1 \text{ ten}} \quad \rightarrow \quad \hline \phantom{1 \text{ ten}} \quad \rightarrow \quad 3 \end{array}$$

C. Complete the addition by adding the tens column

$$\begin{array}{r} \text{Finish here} \\ \downarrow \\ 1 \\ 26 \\ + 57 \\ \hline 83 \end{array}$$

Think about it:

How would you describe *carrying over* to a classmate?

Let's practice adding two-digit numbers that require us to carry 1 ten.

YTI #2

Add. Use Example 3 as a guide.

a)
$$\begin{array}{r} 17 \\ + 58 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 48 \\ + 36 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 64 \\ + 29 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 28 \\ + 38 \\ \hline \end{array}$$

Of course, the idea of carrying can extend to other place values as well. Just as

$$6 \text{ ones} + 7 \text{ ones} = 13 \text{ ones,}$$

it's also true that

$$6 \text{ tens} + 7 \text{ tens} = 13 \text{ tens}$$

$$6 + 7 = 13$$

$$60 + 70 = 130$$

$$= 1 \text{ ten and } 3 \text{ ones}$$

$$= 1 \text{ hundred and } 3 \text{ tens}$$

(and 0 ones)

Example 4: Add 358 and 294.

Procedure: Follow the steps outlined here.

A. Starting with the ones column,

Start here
↓
$$\begin{array}{r} 358 \\ + 294 \\ \hline \end{array}$$

$8 + 4 = 12$:

B. Carry the **1 ten** into the tens column

(**1 ten** and 2 ones)

1 ten → $\overset{1}{}$
$$\begin{array}{r} 358 \\ + 294 \\ \hline 2 \end{array}$$

and 2 ones →

C. Adding in the tens column.

$1 + 5 + 9 = 15$ tens:
(**1 hundred** and 5 tens)

1 hundred → $\overset{1}{}\overset{1}{}$
and 5 tens → $\overset{5}{}$
$$\begin{array}{r} 358 \\ + 294 \\ \hline 52 \end{array}$$

D. Complete the addition by adding in the hundreds column.

$$\begin{array}{r} 358 \\ + 294 \\ \hline 652 \end{array}$$

Answer: $358 + 294 = 652$

YTI #3

Add. Use Example 4 as a guide.

a)
$$\begin{array}{r} 179 \\ + 386 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 482 \\ + 168 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 634 \\ + 267 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 525 \\ + 387 \\ \hline \end{array}$$

All of the exercises in YTI #3 required carrying into both the tens place and the hundreds place. Sometimes we'll need to carry into the tens place only, or the hundreds place only, or—as we saw in YTI #1, not carry at all.

YTI #4

Add.

a)
$$\begin{array}{r} 37 \\ + 96 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 375 \\ + 6,925 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 3,708 \\ + 6,533 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 995,213 \\ + 4,787 \\ \hline \end{array}$$

ADDING MORE THAN TWO WHOLE NUMBERS

There are occasions when we need to add a list of numbers, whether they be the prices of items in a grocery cart, or your scores on tests, or the weights of boxes to be shipped to your customers.

Adding more than two numbers is similar to what we've seen already, we just need to be more careful. We still:

- (1) align the numbers so that the ones place is above the ones place, etc., and
- (2) carry the tens (or hundreds) value to the next column for any sum over 9.

When adding three or more numbers, the sum in any one column could be more than 20, as shown in Example 5. In that case, we'd need to carry the 2 to the next column (or 3, if the sum is 30 or more).

Example 5: Add 186, 395, 478 and 294. Follow the steps outlined here.

Procedure: Add one column at a time, starting with the ones column.

Answer:

$$\begin{array}{r}
 \textcircled{\text{C}} \\
 \textcircled{\text{B}} \\
 \textcircled{\text{A}} \\
 \downarrow \quad \downarrow \quad \downarrow \\
 \begin{array}{r}
 186 \\
 395 \\
 478 \\
 + 294 \\
 \hline
 1,353
 \end{array}
 \end{array}$$

A The ones column adds to 23, so place the 3 and carry the 20 (as a 2 in the tens place).

B The tens column adds to 35, so place the 5 and carry the 3 (in the hundreds place).

C The hundreds column adds to 13.

YTI #5

Add. Use Example 5 as a guide. (You may want to place zeros in front of some of the numbers that have fewer digits.)

a)
$$\begin{array}{r}
 7 \\
 36 \\
 + 98 \\
 \hline
 \end{array}$$

b)
$$\begin{array}{r}
 8 \\
 346 \\
 95 \\
 + 673 \\
 \hline
 \end{array}$$

c)
$$\begin{array}{r}
 1,634 \\
 2,976 \\
 9,597 \\
 + 8,967 \\
 \hline
 \end{array}$$

d)
$$\begin{array}{r}
 36,525 \\
 7,489 \\
 20,946 \\
 877 \\
 + 48,103 \\
 \hline
 \end{array}$$

APPLICATIONS OF ADDITION

In a story problem, or word problem, the last sentence is usually in the form of a question asking us to find an amount of something. In the question, you should look for a word or phrase that indicates which operation is to be used.

In an addition problem, you will likely see words like *total*, *combined*, *sum*, and *in all*. There are many situations to which addition can apply.

Example 6: The South Orange County Community College District has two colleges, Irvine Valley College and Saddleback College. Last summer, Irvine Valley had an enrollment of 4,569 and Saddleback had an enrollment of 9,912, and no one attended both colleges. How many total students were enrolled in the entire district last summer?

Procedure: The key word in the last sentence is *total*. This indicates that we should add the student enrollments at each college:

Answer:

Irvine Valley	4,569
<u>+ Saddleback</u>	<u>+ 9,912</u>
Total	14,481

Sentence: Last summer there was a total of 14,481 students enrolled in the district.

YTI #6 Juan’s monthly salary is \$3,457 and his wife Angelica’s monthly salary is \$2,845. What is their combined monthly salary?

Sentence: _____

YTI #7 Allison often travels out of state for business. On her last trip she flew from Los Angeles to Boston (2,988 miles), then from Boston to Miami (1,511 miles), and from Miami to Los Angeles (2,772 miles). How many total miles did she travel on that trip?

Sentence: _____

YTI #8 Enerio is out shopping for a new car for his young family. The Suzuki Aerio has caught his attention. The car has a sticker price of \$16,798. To add a sunroof is an extra \$1,564. Add to that sales tax, \$1,377, and dealer charges of \$983. What is the total cost of the car?

Sentence: _____

PERIMETER

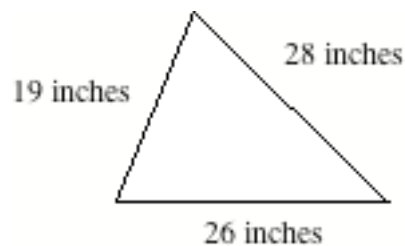
The **perimeter** of a geometric figure—such as a triangle or rectangle—is the total measure around the figure. The perimeter is found by adding the lengths of all of the sides.

For the triangle at right,

$$\text{Perimeter} = 19 \text{ inches} + 28 \text{ inches} + 26 \text{ inches}$$

$$\text{Perimeter} = 73 \text{ inches}$$

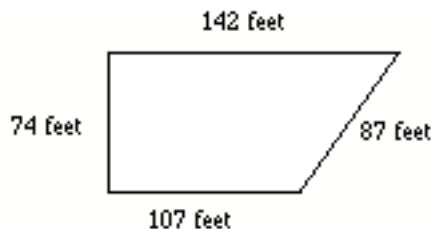
$$\begin{array}{r} 19 \\ 28 \\ + 26 \\ \hline 73 \end{array}$$



YTI #9

Find the perimeter of each shape.

a)



b)



SUBTRACTING WHOLE NUMBERS

Addition and subtraction are *inverse* operations. This means, among other things, we can check our subtraction answers using addition and vice versa. Let's see how this is so by exploring the basics of subtraction.

Consider $8 - 5 = 3$. This type of subtraction is usually written vertically:

$$\begin{array}{r} 8 \\ - 5 \\ \hline 3 \end{array}$$

Because of the inverse nature of addition and subtraction, understanding addition is key to understanding subtraction. Below is an example of how we can use addition to check whether or not our subtraction result (the difference) is correct:

$$\begin{array}{r} 8 \\ - 5 \\ \hline 3 \end{array} \quad \text{because} \quad \begin{array}{r} 3 \\ + 5 \\ \hline 8 \end{array}$$

YTI #10

Subtract. Check each answer (on paper or mentally) by addition.

a)

$$\begin{array}{r} 7 \\ - 4 \\ \hline \end{array}$$

b)

$$\begin{array}{r} 8 \\ - 6 \\ \hline \end{array}$$

c)

$$\begin{array}{r} 8 \\ - 1 \\ \hline \end{array}$$

d)

$$\begin{array}{r} 4 \\ - 4 \\ \hline \end{array}$$

Subtraction of larger numbers follows the same process as single-digit subtraction. Just as in addition, in order to subtract vertically we must align the place values.

Example 7: Subtract $57 - 26$.

Procedure: Follow the steps outlined here:

A Start with the ones column,
 $7 - 6 = 1$

B Then subtract in the tens column: $5 - 2 = 3$

C Check by addition:

Start here **A**

$$\begin{array}{r} 57 \\ - 26 \\ \hline 1 \end{array}$$



Finish here **B**

$$\begin{array}{r} 57 \\ - 26 \\ \hline 31 \end{array}$$

$$\begin{array}{r} 31 \\ + 26 \\ \hline 57 \end{array}$$

This checks out.

Answer: $57 - 26 = 31$

YTI #11

Subtract. Check each answer by addition. Use Example 7 as a guide.

a)
$$\begin{array}{r} 78 \\ - 41 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 83 \\ - 62 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 694 \\ - 321 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 2,576 \\ - 1,471 \\ \hline \end{array}$$

Example 8: Subtract.

a)
$$\begin{array}{r} 683 \\ - 31 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 759 \\ - 725 \\ \hline \end{array}$$

Procedure: a) We can rewrite 31 as 031 so that every place is represented by a digit.

b) Notice that, in the answer, the 0 in the hundreds place is unnecessary.

Answer: →

$$\begin{array}{r} 683 \\ - 31 \end{array} \rightarrow \begin{array}{r} 683 \\ - 031 \\ \hline 652 \end{array}$$

You supply the answer to the check:

Check:

$$\begin{array}{r} 652 \\ + 31 \\ \hline \end{array}$$

$$\begin{array}{r} 759 \\ - 725 \\ \hline 034 \end{array} \rightarrow \begin{array}{r} 759 \\ - 725 \\ \hline 34 \end{array}$$

Check:

$$\begin{array}{r} 34 \\ + 725 \\ \hline \end{array}$$

YTI #12

Subtract. Check each answer by addition. Use Example 8 as a guide.

a)
$$\begin{array}{r} 491 \\ - 61 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 2,156 \\ - 14 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 36,815 \\ - 36,514 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 193,476 \\ - 41,140 \\ \hline \end{array}$$

REGROUPING IN SUBTRACTION

Example 10: For each of these, regroup by taking one ten and making it into 10 ones.

- Answer:**
- a) $58 = \underline{5 \text{ tens and } 8 \text{ ones}} = \underline{4 \text{ tens and } 18 \text{ ones}}$
- b) $90 = \underline{9 \text{ tens and } 0 \text{ ones}} = \underline{8 \text{ tens and } 10 \text{ ones}}$
- c) $16 = \underline{1 \text{ ten and } 6 \text{ ones}} = \underline{0 \text{ tens and } 16 \text{ ones}}$

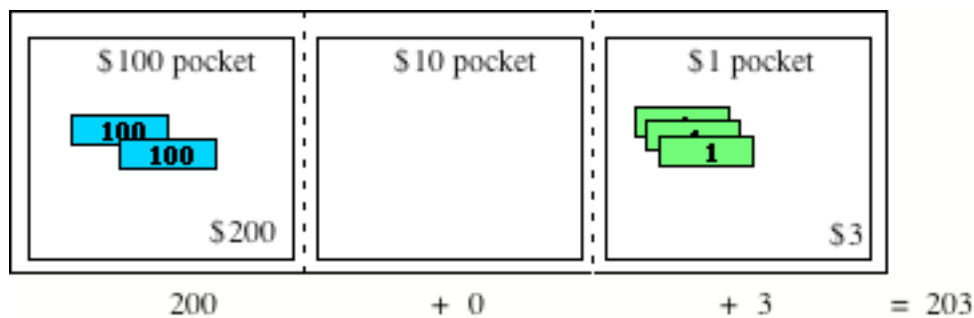
YTI #14

For each of these, regroup by taking one ten and making it into 10 ones. Use Example 10 as a guide.

- a) $24 = \underline{2 \text{ tens and } 4 \text{ ones}} = \underline{\hspace{2cm}}$
- b) $15 = \underline{1 \text{ ten and } 5 \text{ ones}} = \underline{\hspace{2cm}}$
- c) $60 = \underline{6 \text{ tens and } 0 \text{ ones}} = \underline{\hspace{2cm}}$

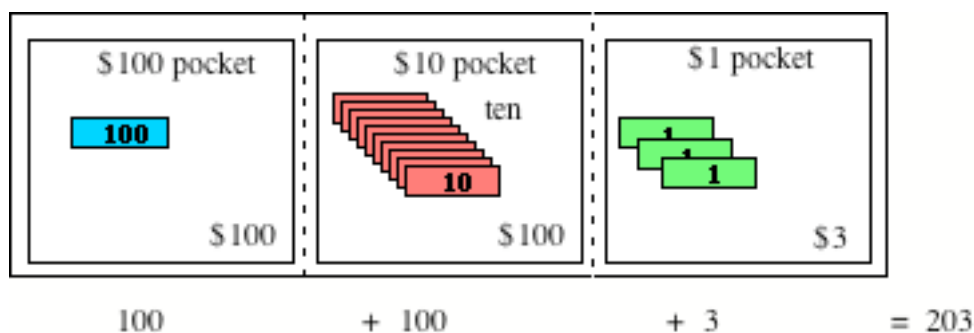
Suppose all you have in your wallet is two \$100 bills and three \$1 bills. What would you do if you needed to trade a \$10 bill for ten \$1 bills?

First, let's look at the money in your wallet: $\$203 = \text{two } \$100 \text{ bills and three } \1 bills.



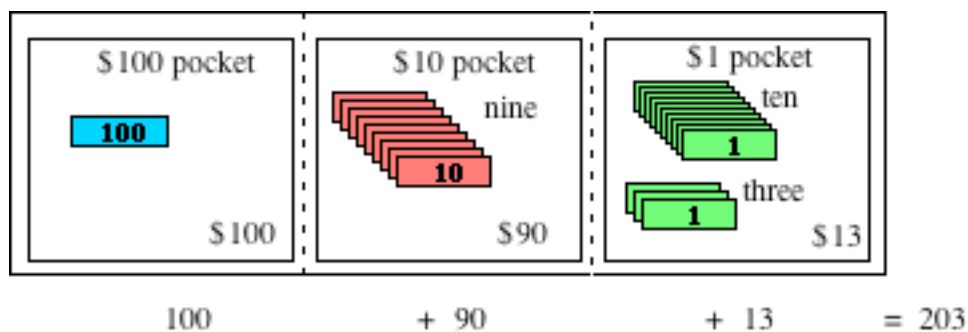
To get a \$10 bill, you would first need to trade *one* of the \$100 bills in for *ten* \$10 bills. Now you have:

$\$203 = \text{one } \$100 \text{ bill, ten } \$10 \text{ bills and three } \1 bills.



Now it's possible to take one \$10 bill and trade it in for ten \$1 bills. Now you have:

\$203 = **one \$100 bill**, **nine \$10 bills** and **thirteen \$1 bills**.



Example 11: For each of these, regroup by first trading 1 hundred for 10 tens. Then trade 1 ten to make 10 ones.

- a) 308 = 3 hundreds, 0 tens, 8 ones
 = 2 hundreds, 10 tens, 8 ones
 = 2 hundreds, 9 tens, 18 ones

- b) 700 = 7 hundreds, 0 tens, 0 ones
 = 6 hundreds, 10 tens, 0 ones
 = 6 hundreds, 9 tens, 10 ones

YTI #15

For each of these, regroup first by trading 1 hundred to make 10 tens. Then take 1 ten to make 10 ones. Use Example 11 as a guide.

- a) 407 = 4 hundreds, 0 tens, 7 ones
 = _____
 = _____

- b) 801 = 8 hundreds, 0 tens, 1 ones
 = _____
 = _____

- c) 102 = 1 hundreds, 0 tens, 2 ones
 = _____
 = _____

- d) 200 = 2 hundreds, 0 tens, 0 ones
 = _____
 = _____

When we subtract, just as when we add, we do so one place at a time. In subtraction, we always start in the ones place first, then go the tens place, and so on.

If we come to a place in which we can't subtract—because the first number is less than the second number—then we need to use regrouping to adjust the first number, as shown in the next example.

Example 12: Subtract. Check using addition. a) 45 b) 537

$$\begin{array}{r} - 18 \\ \hline \end{array}$$

$$\begin{array}{r} - 275 \\ \hline \end{array}$$

Procedure: For each, we'll need to regroup to subtract.

Answer:

a)

(A) Because, in the ones place, 5 is less than 8, we'll need to take from the 40 (represented by the 4 tens) and regroup.

(A)

$$\begin{array}{r} 45 \\ - 18 \\ \hline \end{array}$$

(B) In doing so, the 40 reduces by 10 to become 30 (represented by just 3), and 10 is added to the 5 to become 15; we can then subtract to get 27.

(B)

(A)

$$\begin{array}{r} 315 \\ - 18 \\ \hline 27 \end{array}$$

Complete the check:

$$\begin{array}{r} 27 \\ + 18 \\ \hline \end{array}$$

b)

(A) In this case, we subtract the ones column without needing to regroup.

(A)

$$\begin{array}{r} 537 \\ - 275 \\ \hline 2 \end{array}$$

(B) However, we can't subtract in the tens column until we take from the hundreds place.

(B)

$$\begin{array}{r} 4137 \\ - 275 \\ \hline 262 \end{array}$$

Complete the check:

$$\begin{array}{r} 262 \\ + 275 \\ \hline \end{array}$$

YTI #16

Subtract. Some of these require regrouping more than once. Be careful! Use Example 12 as a guide.

a)

$$\begin{array}{r} 61 \\ - 44 \\ \hline \end{array}$$

b)

$$\begin{array}{r} 163 \\ - 89 \\ \hline \end{array}$$

c)

$$\begin{array}{r} 3,327 \\ - 2,406 \\ \hline \end{array}$$

d)

$$\begin{array}{r} 1,429 \\ - 613 \\ \hline \end{array}$$

Caution: In regrouping, it is very important to keep the columns properly aligned.

Example 13: Subtract $306 - 149$. Be sure to align the numbers vertically. Check by addition.

Procedure:

(A) Here, we need to take from the tens column, but there is only 0 there, meaning no tens at all. So, we must first take from the hundreds column:

$$\begin{array}{r} \text{(A)} \\ 306 \\ - 149 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(A)} \\ 2 \quad 10 \\ \cancel{3} \quad \cancel{0} \quad 6 \\ - 149 \\ \hline \end{array}$$

(B) Now we have 10 in the tens column so we take a ten from it:

$$\begin{array}{r} \text{(B)} \\ 9 \\ \swarrow \quad \searrow \\ 2 \quad \cancel{10} \quad 16 \\ \cancel{3} \quad \cancel{0} \quad \cancel{6} \\ - 149 \\ \hline 157 \end{array}$$

Complete the check:

$$\begin{array}{r} 157 \\ + 149 \\ \hline \end{array}$$

Answer: \rightarrow

YTI #17

Subtract. Some of these require regrouping more than once. Be careful! Use Example 13 as a guide.

a)
$$\begin{array}{r} 620 \\ - 312 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 450 \\ - 256 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 2,000 \\ - 1,316 \\ \hline \end{array}$$

APPLICATIONS INVOLVING SUBTRACTION

Here are some applications involving subtraction. Generally, subtraction is used when we are asked to compare two numbers. Phrases like, "How much more than..." or "What is the difference between..." or "What was the change in..." almost always indicate subtraction.

For each, check the answer with addition, and write a sentence answering the question.

YTI #18

Tammi sold \$132 worth of Girl Scout cookies and Monica sold \$84 worth of them. How much more did Tammi sell than Monica?

Sentence: _____

YTI #19

Marcus traveled 1,385 miles on business last month while Ruben traveled 859 miles. How many more miles did Marcus travel last month than Ruben?

Sentence: _____

YTI #20

South Orange County Community College District has two colleges, Irvine Valley College and Saddleback College. Last summer Irvine Valley had an enrollment of 4,569 and Saddleback had an enrollment of 9,912, and no one attended both colleges. How many more students attended Saddleback than Irvine Valley?

Sentence: _____

YTI #21

Last year Sara's annual salary was \$24,389. This year she got a raise and is now making \$25,742. What was the amount of Sara's raise?

Sentence: _____

YTI #22

Two years ago, Sam's Neighborhood Market had receipts totaling \$1,685,417. Last year, sales were better and the market had receipts totaling \$1,805,302. How much more were the market receipts last year than the year before?

Sentence: _____

You Try It Answers

Add.

$$\begin{array}{r} 1. \quad 17 \\ + 42 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 41 \\ + 56 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 425 \\ + 132 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 416 \\ + 23 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 52 \\ + 835 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 5,461 \\ + 36 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 72 \\ + 6,803 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 1,581 \\ + 3,709 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 4,706 \\ + 58,219 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 24,360 \\ + 74,654 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 15,086 \\ + 742,511 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 230,495 \\ + 604,201 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 41,580 \\ + 63,219 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 34,962 \\ + 81,050 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 875,213 \\ + 124,787 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 263,819 \\ + 612,086 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 28 \\ 35 \\ + 41 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 36 \\ 94 \\ 28 \\ + 50 \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad 129 \\ 214 \\ 78 \\ + 396 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 512 \\ 418 \\ 91 \\ + 229 \\ \hline \end{array}$$

$$\begin{array}{r} 21. \quad 4,426 \\ 9,508 \\ + 3,077 \\ \hline \end{array}$$

$$\begin{array}{r} 22. \quad 11,581 \\ 6,215 \\ + 23,024 \\ \hline \end{array}$$

$$\begin{array}{r} 23. \quad 52,681 \\ 17,938 \\ 33,075 \\ + 40,206 \\ \hline \end{array}$$

$$\begin{array}{r} 24. \quad 146,819 \\ 253,022 \\ 346,795 \\ + 361,364 \\ \hline \end{array}$$

Subtract. Check each answer (on paper or mentally) by addition.

$$\begin{array}{r} 25. \quad 285 \\ - 33 \\ \hline \end{array}$$

$$\begin{array}{r} 26. \quad 389 \\ - 269 \\ \hline \end{array}$$

$$\begin{array}{r} 27. \quad 147 \\ - 45 \\ \hline \end{array}$$

$$\begin{array}{r} 28. \quad 964 \\ - 920 \\ \hline \end{array}$$

$$\begin{array}{r} 29. \quad 3,452 \\ - 140 \\ \hline \end{array}$$

$$\begin{array}{r} 30. \quad 48,839 \\ - 614 \\ \hline \end{array}$$

$$\begin{array}{r} 31. \quad 42 \\ - 17 \\ \hline \end{array}$$

$$\begin{array}{r} 32. \quad 63 \\ - 25 \\ \hline \end{array}$$

$$\begin{array}{r} 33. \quad 53 \\ - 48 \\ \hline \end{array}$$

$$\begin{array}{r} 34. \quad 80 \\ - 29 \\ \hline \end{array}$$

$$\begin{array}{r} 35. \quad 100 \\ - 46 \\ \hline \end{array}$$

$$\begin{array}{r} 36. \quad 100 \\ - 73 \\ \hline \end{array}$$

37.	156 – 99 <hr/>	38.	274 – 93 <hr/>	39.	621 – 528 <hr/>	40.	512 – 133 <hr/>
41.	230 – 157 <hr/>	42.	406 – 392 <hr/>	43.	316 – 23 <hr/>	44.	800 – 352 <hr/>
45.	5,461 – 36 <hr/>	46.	2,754 – 1,121 <hr/>	47.	40,216 – 15,381 <hr/>	48.	604,201 – 230,495 <hr/>
49.	6,803 – 72 <hr/>	50.	2,374 – 515 <hr/>	51.	4,426 – 133 <hr/>	52.	25,053 – 624 <hr/>
53.	135,604 – 2,261 <hr/>	54.	742,511 – 5,086 <hr/>	55.	300,000 – 106,578 <hr/>	56.	1,000,000 – 361,047 <hr/>

Work each application and answer with a complete sentence.

- 57.** Throughout 2004, Dionne gave monetary donations to two charities, \$1,258 to the Salvation Army and \$875 to the United Way. What was Dionne’s total contribution to these two charities?
- 58.** Ron’s electric bill for July was \$212 but only \$87 for June. How much more was Ron’s electric bill for July than June?
- 59.** Debbie has an adjustable rate mortgage that could change from year to year. In 2003, her monthly mortgage payment was \$1,426. In 2004, her monthly payment was \$1,347. How much less was Debbie’s monthly payment in 2004 than in 2003?
- 60.** Throughout their NBA careers, Kareem Abdul Jabbar scored a total of 38,387 points and Micheal Jordan scored a total of 29,277 points. How many more total points did Kareem Abdul Jabbar score than Micheal Jordan? *Source: sportsillustrated.cnn.com*

61. The Detroit office of Globe Realty employs four agents. Mike, the owner, has 21 years of experience in real estate; Ann has 23 years of experience; Uta has 19 years; and Francisco has 17 years. How many combined years of experience in real estate do the four agents have?

62. Eugenia ordered some new furniture for her Portland, Oregon office. The order included an executive desk, \$327; a computer desk, \$133; a swivel chair, \$148; and a client chair, \$92. Along with shipping charges of \$116, what was the total amount of the order? (By the way, there is no sales tax in Oregon!)

63. Baseball attendance figures for a weekend series between the Houston Astros and the Florida Marlins were 35,403 on Friday, 41,292 on Saturday, and 28,515 on Sunday.

a) What was the total attendance for the three-game series?

b) How many more fans were in attendance on Saturday than on Sunday?

64. The elevation of Mount Everest, in Nepal, is 29,035 feet (8,850 meters). The elevation of Mount Kilimanjaro, in Tanzania, is 19,340 feet (5,895 meters). How much higher is Mount Everest than Mount Kilimanjaro...

a) In feet?

b) In meters?

65. Find the perimeter for each figure.

