

Adding and Subtracting Whole Numbers: math lesson, Grade 4 – download the PDF

Big numbers are everywhere: fans in a stadium, miles on a road trip, dollars raised by a school. In Grade 4 you add and subtract numbers with thousands and even ten thousands. You will learn one reliable method, the standard algorithm, and some smart habits: estimating first and checking afterward.

1. Place Value: Why Columns Work

Every digit in a whole number has a value that depends on its place. In 4,758 the digit 4 means 4 thousands, the 7 means 7 hundreds, the 5 means 5 tens, and the 8 means 8 ones. We can write this as $4,758 = 4,000 + 700 + 50 + 8$.

When we add or subtract, we line up the digits so that ones are under ones, tens under tens, hundreds under hundreds, and so on. We only combine digits that are in the same place, because only things of the same size can be added or taken away easily.

D Regrouping

Regrouping means trading units of one place for units of the next place. Ten ones can be traded for one ten, ten tens for one hundred, ten hundreds for one thousand, and so on. Trading the other way works too: one hundred can be traded for ten tens.

Regrouping never changes the value of the number. For example, 3 hundreds and 14 tens is the same amount as 4 hundreds and 4 tens, because $14 \text{ tens} = 1 \text{ hundred} + 4 \text{ tens}$.

2. The Standard Algorithm for Addition

The standard algorithm adds one column at a time, starting at the right (the ones place) and moving left. If the digits in a column add up to 10 or more, you write the ones digit of the total in that column and carry the tens digit to the next column. Carrying is regrouping.

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Method: adding whole numbers

1. Write the numbers one under the other, lining up the places.
2. Add the ones. If the total is 10 or more, write the ones digit and carry 1 to the tens.
3. Add the tens, plus any carried digit. Carry again if needed.
4. Keep going to the hundreds, the thousands, and the ten thousands.
5. Read the answer and check that it is reasonable.

E Example 1: Adding with carrying

Find $4,758 + 2,876$.

Column	Digits added	Write	Carry
Ones	$8 + 6 = 14$	4	1 to the tens
Tens	$5 + 7 + 1 = 13$	3	1 to the hundreds
Hundreds	$7 + 8 + 1 = 16$	6	1 to the thousands
Thousands	$4 + 2 + 1 = 7$	7	none

So $4,758 + 2,876 = 7,634$.

3. The Standard Algorithm for Subtraction

Subtraction also goes column by column from the right. If the top digit is smaller than the bottom digit, you cannot subtract yet. You must regroup: borrow 1 from the next place to the left, which gives 10 more in the current place.

M Method: subtracting whole numbers

1. Write the larger number on top and line up the places.
2. Look at the ones. If the top digit is smaller, borrow 1 ten (take 1 from the tens digit and add 10 to the ones digit).
3. Subtract the ones, then move to the tens and repeat.
4. Continue to the left until every column is done.

E**Example 2: Subtracting with borrowing**

Find $6,243 - 2,719$.

- Ones: $3 < 9$, so borrow from the tens. The 4 tens become 3 tens and the 3 ones become 13 ones. $13 - 9 = 4$.
- Tens: $3 - 1 = 2$.
- Hundreds: $2 < 7$, so borrow from the thousands. The 6 thousands become 5 thousands and the 2 hundreds become 12 hundreds. $12 - 7 = 5$.
- Thousands: $5 - 2 = 3$.

So $6,243 - 2,719 = 3,524$.

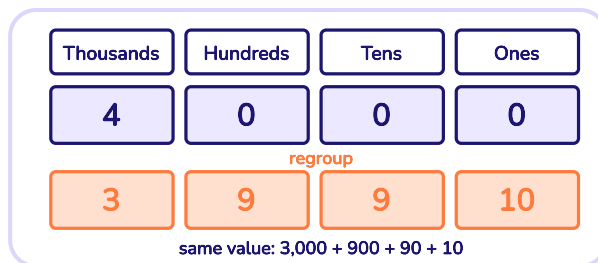
**Watch out**

Never subtract the smaller digit from the larger digit just because it is easier. In $6,243 - 2,719$ the ones column is $3 - 9$, not $9 - 3$. The top number always stays the top number.

4. Regrouping Across Zeros

Zeros are tricky because there is nothing to borrow from. The trick is to keep moving left until you find a digit that is not zero, borrow from it, and then pass the value down one place at a time.

Look at 4,000. We can rewrite it as 3 thousands, 9 hundreds, 9 tens, and 10 ones. The value is the same: $3,000 + 900 + 90 + 10 = 4,000$.



E Example 3: Subtracting across zeros

Find $40,300 - 12,845$.

- Regroup the number 40,300: 4 ten thousands, 0 thousands, 3 hundreds, 0 tens, 0 ones. Take 1 ten thousand and make it 10 thousands. Take 1 thousand and make it 10 hundreds. Take 1 hundred and make it 10 tens. Take 1 ten and make it 10 ones.
- The number is now 3 ten thousands, 9 thousands, 12 hundreds, 9 tens, 10 ones.
- Ones: $10 - 5 = 5$. Tens: $9 - 4 = 5$. Hundreds: $12 - 8 = 4$. Thousands: $9 - 2 = 7$. Ten thousands: $3 - 1 = 2$.

So $40,300 - 12,845 = 27,455$.



Zyro's tip

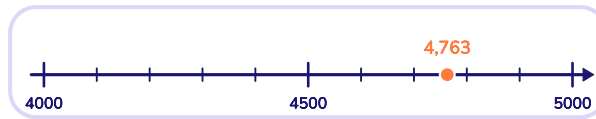
On my planet we have a saying: "Zeros are just empty boxes waiting for a loan."

Borrow from the first digit that is not zero, then hand the extra down box by box, and every zero becomes a 9 (except the last one, which becomes a 10).

5. Estimating Sums and Differences

An estimate is a quick answer that is close to the exact answer. To estimate, round each number to a place that makes the arithmetic easy, then add or subtract the rounded numbers. Rounding to the nearest thousand or hundred is a good choice in Grade 4.

To round, look at the digit to the right of the place you are rounding to. If it is 5 or more, round up. If it is 4 or less, round down. For 4,763, the hundreds digit is 7, so we round up to 5,000 (the nearest thousand).



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Example 4: Estimating and comparing

Estimate $5,862 + 3,148$ by rounding to the nearest thousand.

$5,862 \approx 6,000$ and $3,148 \approx 3,000$, so the estimate is $6,000 + 3,000 = 9,000$. The exact sum is 9,010, which is very close. The estimate tells us the answer should be a little above 9,000.

Estimates are great for catching mistakes. If you compute $5,862 + 3,148$ and get 8,010 or 19,010, your estimate tells you something went wrong. But be careful: when the exact answer might land right next to a limit (like a budget), an estimate is not precise enough. In that case, compute exactly.

6. Checking with Inverse Operations

Addition and subtraction are inverse operations: one undoes the other. This gives you a powerful way to check.

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Inverse relationships

- If $a + b = c$, then $c - b = a$ and $c - a = b$.
- If $a - b = c$, then $c + b = a$.

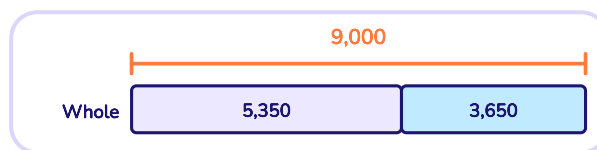
To check a subtraction, add the answer to the number you subtracted. You should get the starting number back. To check an addition, subtract one addend from the sum. You should get the other

addend.

For example, $6,243 - 2,719 = 3,524$. Check: $3,524 + 2,719 = 6,243$. It works, so the answer is right.

7. Bar Models and Multi-Step Word Problems

A bar model is a drawing of rectangles that shows how the numbers in a story are related. A long bar stands for the whole, and shorter bars stand for the parts. A question mark marks the number you want to find. If you know the parts, add to find the whole. If you know the whole and one part, subtract to find the other part.



Many word problems have more than one step. Read the story, draw a bar model for each step, and write down what each answer tells you before you start the next step.

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Method: multi-step word problems

1. Read the problem twice and underline the question.
2. Draw a bar model and label the known numbers.
3. Decide whether to add or subtract for the first step. Solve it.
4. Use that answer in the second step.
5. Check with an estimate or an inverse operation, then write a sentence that answers the question with the right unit.

E**Example 5: A food drive**

A school collected 12,480 cans in the fall and 9,735 cans in the winter. The goal is 25,000 cans. How many more cans does the school need?

Step 1: the total so far is $12,480 + 9,735 = 22,215$ cans.

Step 2: the cans still needed are $25,000 - 22,215 = 2,785$ cans.

Check: $22,215 + 2,785 = 25,000$. The school needs 2,785 more cans.

**Watch out**

Do not stop after the first step. Reread the question to be sure you answered what was asked, not just a part of it.

Key takeaways

- Line up the places, then add or subtract one column at a time, from right to left.
- In addition, carry when a column totals 10 or more. In subtraction, borrow when the top digit is smaller than the bottom digit.
- To subtract across zeros, borrow from the first non-zero digit and pass the value down place by place.
- Estimate first by rounding. Compare your exact answer with the estimate.
- Check addition with subtraction and subtraction with addition.
- Bar models show the whole and the parts. Use them to plan multi-step word problems, and answer with a full sentence.



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