Fourth Grade: Mathematics
Unit 1: Math Strategies

Math Strategies for Addition

Open Number Line (Adding Up)

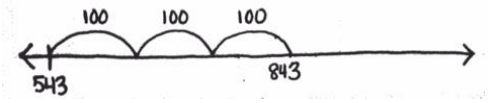
The example below shows 543 + 387 using the open number line.

First, you need to draw a blank number line to record your jumps.

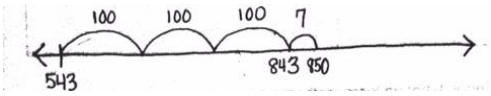
Then you need to plot the bigger addend, 543, on the left.

To add 387 to 543, you can decompose 387 into 300 + 80 + 7.

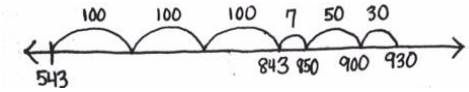
Next, add parts of 387 to 543 by making jumps.
For example, you can make 3 jumps of 100 to land on 843.



Next you can make a jump of 7 to get to 850.



After that, you can make a jump of 50 to land on 900 and then a jump of 30 to land on 930.



So, 543 + 387 = 930.

This is a very flexible strategy. Different amounts of jumps can be made depending on what you know.
Try making the least amount of jumps to solve the problem efficiently.

Compensation

The example below shows 543 + 387 using Compensation.

Compensation is a short cut used to add mentally.
When adding, the change made to one addend is the opposite of the change made to the other addend.

For, 543 + 387, you can add 57 to 543 to get a friendly number of 600. Then you have to subtract 57 from 387.

Now, it's easy to add 600 and 330 mentally to get 930.

$$\begin{array}{r} 543 + 387 \\ \underline{+\ 57 \quad -57} \\ 600 + 330 = 930 \end{array}$$

Adding Up in Chunks

The example below shows 543 + 387 using Adding Up in Chunks

First, decompose one of the addends to its place value. 387 will be decomposed into 300 + 80 + 7.
543 + (300 + 80 + 7)

Then, add the chunks or parts of 387 to 543.

543 + **7** = 550
550 + **300** = 850

If you can't add 80 to 850 mentally, then you can break 80 into chunks that are easier to add. So in this case 80 will be decomposed to 50 + 30 because it's easier to add 50 to 850.

850 + **50** = 900
900 + **30** = 930

So, 543 + 387 = 930.

543 + **7** = 550
550 + **300** = 850
850 + **50** = 900
900 + **30** = 930

This is a very flexible strategy, because the addend can be decomposed into different amounts of chunks depending on what you know.

Partial Sums (Breaking into its Place Value)

The example below shows 543 + 387 using Partial Sums.

First, you need to decompose both addends into its place value.

(500 + 40 + 3) + (300 + 80 + 7)

Then, you add the numbers in each place value together. It doesn't matter which place value you add first.

3 + 7 = 10
40 + 80 = 120
500 + 300 = 800

Next, you add the partial sums together.

800 + 120 + 10 = 930

So, 543 + 387 = 930.

This strategy can also be recorded vertically:

$$\begin{array}{r} 543 \\ +\ 387 \\ \hline 10 \\ 120 \\ +\ 800 \\ \hline 930 \end{array}$$

Standard Algorithm

The example below shows 175 + 168 using the standard algorithm.

You have to write the problem vertically and line the numbers by its place value. First, you add the ones, then the tens and hundreds.

$$\begin{array}{r} {\scriptstyle 1\,1} \\ 175 \\ +\,168 \\ \hline 343 \end{array}$$

5 + 8 = 13
You have to move the 10 in the 13 over to the 10's column.

10 + 70 + 60 = 140
You have to move the 100 in 140 over to the 100's column.

100 + 100 + 100 = 300

So, 175 + 168 = 343.

Math Strategies for Subtraction

Removal

The example below shows 543 − 387 using Removal.

First, decompose the smaller number to its place value. 387 will be decomposed into 300 + 80 + 7.

543 − (300 + 80 + 7)

Then, subtract the chunks or parts of 387 from 543.

543 − **300** = 243

If you can't subtract 7 from 243 mentally, then you can break 7 into chunks that are easier to subtract. So in this case 7 will be decomposed to 3 + 4 because it's easier to subtract from 243.

243 − **3** = 240

You can break 80 into chunks that are easier to subtract. So in this case 80 will be decomposed to 40 + 40 because it's easier to subtract from 240.

240 − **40** = 200
200 − **40** = 160

Finally, subtract 4 from 160 to get 156.

160 − **4** = 156

So, 543 − 387 = 156.

543 − (300 + 3 + 40 + 40 + 4) = 156

543 - **300** = 243
243 - **3** = 240
240 - **40** = 200
200 - **40** = 160
160 - **4** = 156

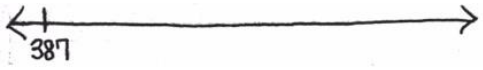
This is a very flexible strategy, because the number can be decomposed into different amounts of chunks depending on what you know.

Open Number Line (Adding Up)

The example below shows 543 − 387 using the open number line.

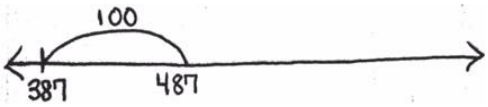
First, you need to draw a blank number line to record your jumps.

Then you need to plot the smaller number, 387, on the left.

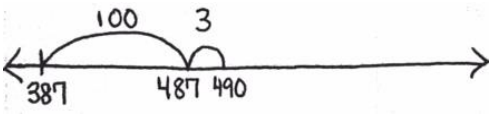


To subtract 387 from 543, you need to count up to get to 543.
You can do that by making jumps of 100s, 10s, 1s or other friendly numbers.

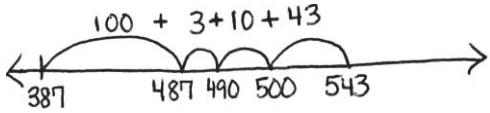
For example, you can make 1 jump of 100 to land on 487.



Next, you can make a small jump of 3 to get to 490.



After that, you can make a jump of 10 to land on 500. Then make a jump of 43 to land on 543.



Now you need to add the jumps together to get your answer.

$$100 + 3 + 10 + 43 = 156$$

So, 543 − 387 = 156.

This is a very flexible strategy. Different amounts of jumps can be made depending on what you know.
Try making the least amount of jumps to solve the problem efficiently.

Keeping a Constant Difference

The example below shows 543 − 387 using Keeping a Constant Difference.

This strategy is a short cut used to subtract mentally. When subtracting, make the same change to both numbers. The difference between the numbers will remain the same.

For, 543 − 387, you can add 13 to 387 to get a friendly number of 400.
Then you have to add 13 to 543 to get 556.

Now, it's easy to subtract 400 from 556 mentally to get 156.

$$\begin{array}{r} 543 - 387 \\ \underline{+\ 13 \quad +13} \\ 556 - 400 = 156 \end{array}$$

Breaking into its Place Value

The example below shows 543 − 387 using Breaking into its Place Value.

First, you need to decompose both numbers into its place value.

$$(500 + 40 + 3) - (300 + 80 + 7)$$

Then, rewrite the problem vertically so you subtract the numbers in each place value together.

$$\begin{array}{r} 500 + 40 + 3 \\ \underline{-\ 300 + 80 + 7} \end{array}$$

Next, subtract the ones. Since you can't take 7 ones away from 3 ones, you need to take a one ten from 40 to make 13 ones. Now you can subtract 7 from 13, which is 6.

$$\begin{array}{r} 30 \quad 13 \\ 500 + \cancel{40} + \cancel{3} \\ \underline{-\ 300 + 80 + 7} \\ 6 \end{array}$$

After that, subtract the tens. Since you can't take 80 away from 30, you need to take a hundred from 500 to make 13 tens or 130. Now you can subtract 80 from 130, which is 50.

$$\begin{array}{r} 130 \\ 400 \quad \cancel{30} \quad 13 \\ \cancel{500} + \cancel{40} + \cancel{3} \\ \underline{-\ 300 + 80 + 7} \\ 50 + 6 \end{array}$$

Then, subtract the hundreds. 400 - 300 is 100. Add the partial differences together to get 156.

$$\begin{array}{r} 130 \\ 400 \quad \cancel{30} \quad 13 \\ \cancel{500} + \cancel{40} + \cancel{3} \\ \underline{-\ 300 + 80 + 7} \\ 100 + 50 + 6 \end{array}$$

So, 543 − 387 = 156.

Standard Algorithm

The example below shows 327 − 118 using the standard algorithm.

You have to write the problem vertically and line the numbers by its place value. First, you subtract the ones, then the tens and hundreds. Since you can't take 8 away from 7, you have to take one ten from the 2 tens to regroup and get 17 ones.

$$\begin{array}{r} \overset{1}{} \\ 3\cancel{2}17 \\ \underline{-\ 118} \\ 209 \end{array}$$

$17 - 8 = 9$
$10 - 10 = 0$
$300 - 100 = 200$

So, 327 − 118 = 209.