

Reasoning and Problem Solving

Step 8: Efficient Subtraction

Teaching Note:

This step explores different methods of subtraction. Children may find some methods more efficient than others and these can vary between children. Ensure discussion takes place to explore why children find various methods more efficient than others.

National Curriculum Objectives:

Mathematics Year 4: (4C2) [Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate](#)

Mathematics Year 4: (4C3) [Estimate and use inverse operations to check answers to a calculation](#)

Mathematics Year 4: (4C4) [Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Check a method of subtraction and create a further calculation for the method. Involves subtracting two 3-digit numbers (no exchanges).

Expected Check a method of subtraction and identify how it could be done more efficiently. Involves subtracting two 4-digit numbers (with exchanges).

Greater Depth Check a method of subtraction and identify how it could be done more efficiently. Involves subtracting 3-digit numbers from a 4-digit number (with exchanges).

Questions 2, 5 and 8 (Reasoning)

Developing Explain whether a suggested method is efficient. Includes subtracting two 3-digit numbers, with no exchanging.

Expected Explain whether a suggested method is efficient. Includes subtracting two 4-digit numbers, with exchanges.

Greater Depth Explain whether a suggested method is efficient. Includes subtracting 3-digit numbers from a 4-digit number and two 4-digit numbers, with exchanges and multi-step subtractions.

Questions 3, 6 and 9 (Reasoning)

Developing Compare two methods of subtracting two 3-digit numbers (no exchanges).

Expected Compare two methods of subtracting two 4-digit numbers (with exchanges).

Greater Depth Compare two methods of subtracting a 3-digit number from a 4-digit number (with exchanges).

More [Year 4 Addition and Subtraction](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

Efficient Subtraction

Efficient Subtraction

1a. Check the calculation below.

	5	9	7
-	4	5	3
<hr/>			
	1	4	4
<hr/>			

Is this method efficient?

Create another calculation where the column method is efficient.



PS

1b. Check the calculation below.

	9	8	6
-	3	5	1
<hr/>			
	6	3	5
<hr/>			

Is this method efficient?

Create another calculation where the column method is efficient.



PS

2a. Caleb says,



An efficient way of completing this calculation is to partition.

359	
?	239

Is he correct? Prove it.

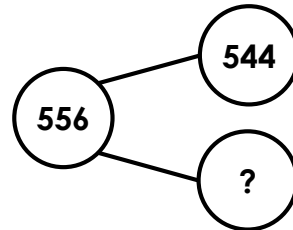


R

2b. Mandi says,



An efficient way of completing this calculation is to count on.



Is she correct? Prove it.



R

3a. The children are solving this subtraction: $857 - 700$.



Katy

I'll use a mental method.



Harry

I'll use partitioning.

Complete the calculations using both the suggested methods.

Which was quickest? Why?



R

3b. The children are solving this subtraction: $180 - 150$.



Luke

I'll use the column method.



Bea

I'll count on in 10s.

Complete the calculations using both the suggested methods.

Which was quickest? Why?



R

Efficient Subtraction

Efficient Subtraction

4a. Check the calculation below.

	4	5 ⁴	2 ¹¹	3 ¹
-	2	4	9	8
	2	0	2	5

Is this method efficient?

What could be added to both numbers to make it more efficient?



PS

4b. Check the calculation below.

	6 ⁵	0 ¹⁹	0 ¹⁹	0 ¹
-	3	5	4	7
	2	4	5	3

Is this method efficient?

What could be subtracted from both numbers to make it more efficient?



PS

5a. Colin says,



An efficient way of completing this calculation is to count on.

	7,452
?	7,390

Is he correct? Prove it.

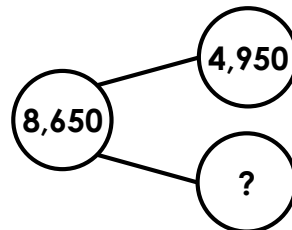


R

5b. Ellie says,



An efficient way of completing this calculation is to add 50 to both numbers.



Is she correct? Prove it.



R

6a. The children are solving this subtraction: $1,250 - 1,197$.



Jess

I'll use the column method.



Luke

I will add 3 to both numbers and count on.

Complete the calculations using both the suggested methods.

Which was quickest? Why?



R

6b. The children are solving this subtraction: $7,283 - 5,979$.



Colin

I will add 1 to both then partition.



Faith

I'll use the column method.

Complete the calculations using both the suggested methods.

Which was quickest? Why?



R

Efficient Subtraction

Efficient Subtraction

7a. Check the calculation below.

	⁴ 5	¹ 0	⁹ 0	¹ 0
-		6	9	5
	4	3	0	5

Is this method efficient?

What could be done to both numbers to make it more efficient?



PS

7b. Check the calculation below.

	3	⁸ 9	¹¹ 2	¹ 0
-		8	9	8
	3	0	2	2

Is this method efficient?

What could be done to both numbers to make it more efficient?



PS

8a. Leon says,



An efficient way of completing the problem is to calculate the total cost of the furniture, then count on in hundreds to find out how much money she has left.

Holly has £3,500. She buys a sofa for £2,156 and a chair for £644. How much does she have left?

Is he correct? Prove it.



R

8b. Amy says,



An efficient way of completing the problem is to find the total cost of the items, then use a column method to subtract it from the amount he started with.

Arthur has £4,000. He buys a bike for £869 and a skateboard for £128. How much does he have left?

Is she correct? Prove it.



R

9a. The children are solving this subtraction: $5,000 - 980$.



Faith

I'll add 20 then count on in hundreds.



Caleb

I'll add 20 and then count on in thousands.

Complete the calculations using both the suggested methods.

Which was quickest? Why?



R

9b. The children are solving this subtraction: $8,945 - 653$.



Jess

I'll use a column method.



Steve

I'll use a number line to count on.

Complete the calculations using both the suggested methods.

Which was quickest? Why?



R

Reasoning and Problem Solving Efficient Subtraction

Developing

- 1a. The method is efficient. Accept any answer where calculation is not easily subtracted mentally.
- 2a. He is correct because there are no exchanges e.g. $359 - 200 = 159$. $159 - 30 = 129$. $129 - 9 = 120$.
- 3a. Katy's method should be quicker as there are no values in the tens and ones columns to subtract.

Expected

- 4a. Various answers, for example: The method is not efficient. Adding 2 to both numbers would make the calculation more efficient.
 $4,525 - 2,500$ is easier to calculate than $4,523 - 2,498$.
- 5a. He is correct because the numbers are close together. Adding 10 more to 7,390 would make 7,400, then count on 52. The answer is 62.
- 6a. Luke's method should be quicker as his calculation requires no exchanging.

Greater Depth

- 7a. Various answers, for example: The method is not efficient. Subtracting 1 from both numbers would make the calculation more efficient.
 $4,999 - 694$ is easier to calculate than $5,000 - 695$.
- 8a. He is correct. The items cost £2,800 in total. It should be easy to count on in hundreds to £3,500. The answer is £700.
- 9a. Caleb's method should be quicker as there are only 5 thousands between the two numbers but there are 50 hundreds.

Reasoning and Problem Solving Efficient Subtraction

Developing

- 1b. The method is efficient. Accept any answer where calculation is not easily subtracted mentally.
- 2b. She is correct as there is a small difference between the numbers. The answer is 12.
- 3b. Bea's method should be quicker as the numbers are close and are both multiples of 10.

Expected

- 4b. Various answers, for example: The method is not efficient. Subtracting 1 from both numbers would make the calculation more efficient.
 $5,999 - 3,546$ is easier to calculate than $6,000 - 3,547$.
- 5b. She is correct because adding 50 to both numbers will create $8,700 - 5,000$ and there will be no exchanges. The answer is 3,700.
- 6b. Faith's method should be quicker as Colin will still have to exchange.

Greater Depth

- 7b. Various answers, for example: The method is not efficient. Adding 2 to both numbers would make the calculation more efficient.
 $3,922 - 900$ is easier to calculate than $3,920 - 898$.
- 8b. She is incorrect because a column method would result in lots of exchanges. She should add 3 to 997 and then count on in 1000's. The answer is £3,003.
- 9b. Jess's method should be quicker as there is only one exchange to complete. A number line would take longer to complete.