

Addition and Subtraction Diagnostic Quiz and Answers

Diagnose pupils' individual learning gaps in addition and subtraction



Addition and Subtraction Quiz

Please tick your answer to each question.

You can use the space on the right for your working out if you need it.

Don't
forget to
tick your
answer!

1. Add these numbers mentally

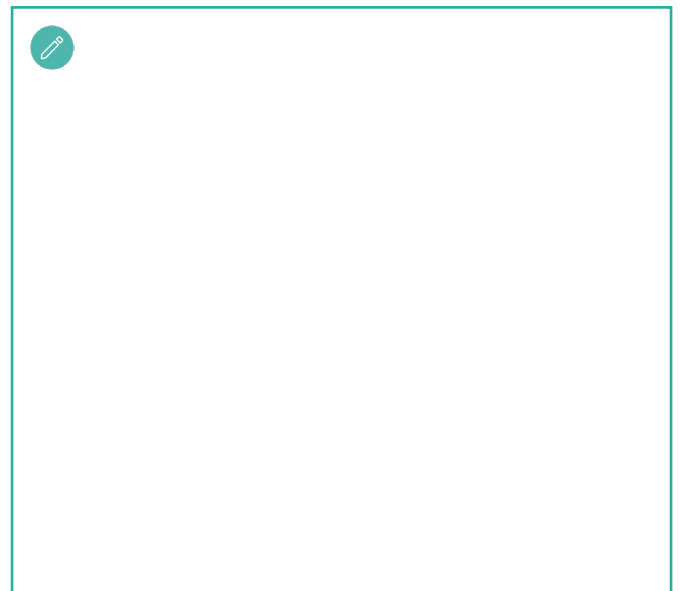
$$5\ 150 + 3\ 734$$

- a) ☐ 8 484
- b) ☐ 8 884
- c) ☐ 81 289
- d) ☐ 8 880

A large rectangular box for working out, with a small circular icon containing a pencil in the top-left corner.


2. George added $3\ 971 + 4\ 056$ in his head. He thought the answer was $79\ 127$. What error did he make?

- a) ☐ George multiplied the numbers together
- b) ☐ George got mixed up
- c) ☐ When George added the tens together and got '12 tens', he forgot to carry
- d) ☐ George accidentally saw 3 971 as 39 971

A large rectangular box for working out, with a small circular icon containing a pencil in the top-left corner.


3. Subtract these numbers mentally
17 943 – 6 581

- a) ☐ 11 362
- b) ☐ 24 524
- c) ☐ 11 442
- d) ☐ 11 462




4. Add these numbers mentally
95 103 + 9 416

- a) ☐ 189 263
- b) ☐ 914 519
- c) ☐ 189 109
- d) ☐ 104 519



5. What are you being asked to find when calculating
4 763 + 1 098?

- a) ☐ The product
- b) ☐ Factors
- c) ☐ The sum
- d) ☐ The quotient



6. Explain how you would calculate $13\,000 - 6\,885$

- a) ☐ I would use column subtraction because there are large numbers and exchanging
- b) ☐ I would do it in my head, starting by taking away 6 thousands from 3 thousand and exchanging.
- c) ☐ I would take 1 off both numbers and then subtract mentally.
- d) ☐ I would do it in my head by counting on from 6 885 to 13 000. I would use my number facts to 10 to help me.



7.
$$\begin{array}{r} 7\,483 \\ + 3\,958 \\ \hline \end{array}$$

a) ☐

	7	4	8	3
+	3	9	5	8
	1	4	4	1
	1	1	1	

c) ☐

	7	4	8	3
+	3	9	5	8
1	0	3	3	1

b) ☐

	7	4	8	3
+	3	9	5	8
1	0	3	3	1
	1	1	1	

d) ☐

	7	4	8	3
+	3	9	5	8
1	1	4	4	1
1	1	1	1	



8. $[] + 875 = 4\,032$

a) ☐ 4 907

b) ☐ 3 157

c) ☐ 4 843

d) ☐ 3 263



9. What are you being asked to find when calculating
 $94\,100 - 24\,680 = []$?

a) ☐ Sum

b) ☐ Multiple

c) ☐ Difference

d) ☐ Quotient



10. $9\,234 - [] = 7\,690$

a) ☐ 1 544

b) ☐ 1 664

c) ☐ 16 924

d) ☐ -1 544



11.
$$\begin{array}{r} 90451 \\ + 7581 \\ \hline \end{array}$$

a)

	9	0	4	5	1
-		7	5	8	1
	8	2	8	7	1

c)

	9	0	4	5	1
-		7	5	8	1
	8	2	8	7	0

b)

	9	0	4	5	1
-		7	5	8	1
	8	3	8	7	0

d)

	9	0	4	5	1
-		7	5	8	1
	9	7	1	3	0

12.

	7	5	[]	7
-	2	[]	4	3
	4	9	5	4

a)

	7	5	9	7
-	2	4	4	3
	4	9	5	4

c)

	7	5	9	7
-	2	8	4	3
	4	9	5	4

b)

	7	5	1	7
-	2	6	4	3
	4	9	5	4

d)

	7	5	9	7
-	2	6	4	3
	4	9	5	4

Don't forget to tick your answer!

13. What error has been made?

	9 ⁸	4 ¹	1 ⁰	4 ¹²³	0
-		8	0	4	3
	8	6	0	8	7

- a) ☐ The hundreds should not have been exchanged because you can take 0 hundreds away from 1 hundred
- b) ☐ The tens are wrong because they have just added 4 and 4
- c) ☐ The 9 should not have been exchanged because it had nothing to take away
- d) ☐ The tens have been exchanged by mistake. There should have been 13 tens

14. 8 209mm – 5 506mm

- a) ☐ 13 715mm
- b) ☐ 3 703mm
- c) ☐ 2 703mm
- d) ☐ 3 303mm

15.

	2	2	[]	6	4
+	8	[]	2	5	3
1	[]	3	2	1	7
		1	1		

a) ☐

	2	2	5	6	4
+	8	6	2	5	3
1	0	3	2	1	7
		1	1		

c) ☐

	2	2	0	6	4
+	8	1	2	5	3
1	0	3	2	1	7
		1	1		

b) ☐

	2	2	9	6	4
+	8	0	2	5	3
1	0	3	2	1	7
		1	1		

d) ☐

	2	2	2	6	4
+	8	3	2	5	3
1	2	3	2	1	7
		1	1		

16. On Monday, a factory made 437 805 phones. This was 28 742 more phones than they made on Sunday. The factory then made 415 018 phones on Tuesday. **How many phones were manufactured over the 3 days?**

- a) ☐ 881 565 phones
- b) ☐ 1 261 886 phones
- c) ☐ 409 063 phones
- d) ☐ 824 081 phones


17. $[] - 8\,632 = 7\,918$?

- a) ☐ 714
- b) ☐ 1 714
- c) ☐ 15 550
- d) ☐ 16 550




18. $1[]5.29\text{kg} - 39.[]1\text{kg} = 15[].98\text{kg}$?

- a) ☐ $185.29\text{kg} - 39.31\text{kg} = 155.98\text{kg}$
- b) ☐ $195.29\text{kg} - 39.31\text{kg} = 155.98\text{kg}$
- c) ☐ $115.29\text{kg} - 39.71\text{kg} = 154.98\text{kg}$
- d) ☐ $185.29\text{kg} - 39.71\text{kg} = 154.98\text{kg}$



19. $91802.08 + 3610.21$

- a) ☐ 98 112.29
- b) ☐ 127 904.18
- c) ☐ 127 902.29
- d) ☐ 95 412.29




20. Rhia buys a drum kit for £269.99 and a microphone for £84.45. She pays for it with £400.00. **How much change will she receive?**

- a) ☐ £754.44
 b) ☐ £45.56
 c) ☐ £354.44
 d) ☐ £45.55



21. The population of Rome is 3 927 026 and the population of Milan is 5 307 508. **Which answer below would be the closest estimate of the population of both the cities to the nearest 100 000?**

- a) ☐ 9 000 000
 b) ☐ 9 200 000
 c) ☐ 9 234 534
 d) ☐ 9 240 000




22. Each type of shape is a different number. What value is  ?

$$\text{circle} + \text{triangle} = 32$$

$$\text{circle} + \text{circle} = 18$$

- a) ☐ 9
 b) ☐ 41
 c) ☐ 50
 d) ☐ 23



23. £10 593 - £8 908

a)

	1 ₀	0 ₉	5 ₁	9 ₈	3 ₁
-		8	9	0	8
	£	2	6	8	5

b)

	1	0	5	9	3
-		8	9	0	8
	£	7	6	8	5

c)

	1 ₀	0 ₉	5 ₁	9 ₈	3 ₁
-		8	9	0	8
	£	1	6	8	5

d)

	1 ₀	0 ₉	5 ₁	9 ₈	3 ₁
-		8	9	0	8
	£	1	6	0	5

24. 1 992.08 – 920.84

- a) 1 071.24
- b) 1 070.84
- c) 8 291.24
- d) 1 071.04

25. What is the value of m?
n – 82 = 19
n + m + m = 155

- a) 26
- b) 46
- c) 27
- d) 54

Congratulations on finishing the quiz.
You’ve worked really hard to get this far. Well done!

Addition and Subtraction Diagnostic Quiz Answers

1. Add these numbers mentally $5\,150 + 3\,734$ *Checks adding 4 digit numbers without carrying*
- a) 8 484
Added hundreds with tens. Potentially adding from ones to thousands rather than thousands to ones
- b) 8 884
Correct answer
- c) 81 289
Adding the 5 thousands from 5 150 to each number in 3 734
- d) 8 880
Mistaking the place holder 0 in 5 150 for the sum needed ($0 + 4$)
2. George added $3\,971 + 4\,056$ in his head. He thought the answer was 79 127. What error did he make?
Checks ability to identify when carrying is necessary
- a) George multiplied the numbers together
Lack of understanding of carrying
- b) George got mixed up
Simplistic understanding/expectation of the depth of reasoning required
- c) When George added the tens together and got '12 tens', he forgot to carry
Correct answer
- d) George accidentally saw 3 971 as 39 971
It is likely they sometimes make similar 'mis-reading the question' errors. They didn't estimate as a method to check their answer
3. Subtract these numbers mentally $17\,943 - 6\,581$
Checks ability to subtract numbers mentally beyond 4 digits, where there is 1 exchange required
- a) 11 362
Correct answer
- b) 24 524
Pupil added the numbers together. Read the question carefully before and after calculating
- c) 11 442
Lack of understanding of exchanging in subtraction. 4 tens – 8 tens is understood as commutative (8 tens – 4 tens)
- d) 11 462
During exchanging the pupil forgot to remove a hundred

Addition and Subtraction Diagnostic Quiz Answers

4. Add these numbers mentally $95\,103 + 9\,416$
Checks ability to add numbers mentally beyond 4 digits, where there is 1 carry required
- a) 189 263
Misaligning all the digits and adding from the largest column first
 - b) 914 519
Error in carrying where the ten thousand hasn't been carried over, but just inserted
 - c) 189 109
Place value – child is adding 90 thousand with 9 thousand but realises adding $3 + 6$ ones is 9
 - d) 104 519
Correct answer
5. What are you being asked to find when calculating $4\,763 + 1\,098$?
Checks recognition of vocabulary related to addition
- a) The product
Realises product involves making numbers larger but lack of understanding that it relates to multiplication
 - b) Factors
Complete lack of understanding of factors and potentially a significant lack of understanding of Mathematical vocabulary
 - c) The sum
Correct answer
 - d) The quotient
Potentially just unfamiliar with the term quotient
6. Explain how you would calculate $13\,000 - 6\,885$
Checks ability to select one of the most appropriate calculation methods
- a) I would use column subtraction because there are large numbers and exchanging
Over reliance on written methods. Link with base 10 and counting on not made
 - b) I would do it in my head, starting by taking away 6 thousands from 3 thousand and exchanging
Over relying on mental methods. Link with base 10 and counting on not made
 - c) I would take 1 off both numbers and then subtract mentally
Correct answer – this shows a depth of understanding
 - d) I would do it in my head by counting on from 6885 to 13000. I would use my number facts to 10 to help me
Correct answer

Addition and Subtraction Diagnostic Quiz Answers

7. $7\,483 + 3\,958$

Checks written method of addition with multiple exchanging

a) **Forgetting to carry in the largest digit**

	7	4	8	3
+	3	9	5	8
	1	4	4	1
	1	1	1	

b) **Carrying but not adding the carried digit**

	7	4	8	3
+	3	9	5	8
	1	4	4	1
	1	1	1	

c) **Not carrying**

	7	4	8	3
+	3	9	5	8
	1	4	4	1
	1	1	1	

d) **Correct answer**

	7	4	8	3
+	3	9	5	8
	1	4	4	1
	1	1	1	

8. $[\quad] + 875 = 4\,032$

Checks understanding of missing numbers in calculations

a) 4 907
Has not recognised that the inverse operation is needed here and has added instead

b) 3 157
Correct answer

c) 4 843
Pupil has not recognised the non-commutative aspect of subtraction and has simply taken the smaller number from the bigger number in each column

d) 3 263
Correct method attempted but becoming mixed up with exchanging in the tens

Addition and Subtraction Diagnostic Quiz Answers

9. What are you being asked to find when calculating $94\ 100 - 24\ 680 = [\]$?
Checks recognition of vocabulary related to addition

- a) Sum
No understanding of sum or subtraction vocabulary
- b) Multiple
No understanding of the multiple or subtraction vocabulary
- c) Difference
Correct answer
- d) Quotient
No understanding of quotient or subtraction vocabulary

10. $9\ 234 - [\] = 7\ 690$
Checks understanding of missing numbers in calculations

- a) 1 544
Correct answer
- b) 1 664
Error in exchanging
- c) 16 924
Added. Potential lack of understanding with missing numbers first or second in a calculation
- d) -1 544
Calculated $7\ 690 - 9\ 234$

11. $90\ 451 - 7\ 581$
Checks written method of subtraction with multiple exchanging

- a)

	9	0	4	5	1
-		7	5	8	1
	8	2	8	7	1

Error in ones (1-1)

- b)

	9	0	4	5	1
-		7	5	8	1
	8	3	8	7	0

Becoming mixed up when exchanging from ten thousands to hundreds

- c)

	9	0	4	5	1
-		7	5	8	1
	8	2	8	7	0

Correct answer

- d)

	9	0	4	5	1
-		7	5	8	1
	9	7	1	3	0

Taking the smaller number from the bigger number in each column with no regard for working from top to bottom. Lack of understanding of the commutative law

Addition and Subtraction Diagnostic Quiz Answers

12. Find the missing numbers: $75[]7 - 2[]43 = 4954$
Checks depth of understanding of written subtraction

a) **Confusion over adding hundreds rather than subtracting**

		7	5	9	7
-		2	4	4	3
		4	9	5	4

b) **Subtracting any smaller number from any bigger number that is known. Very limited understanding of written method of subtraction**

		7	5	1	7
-		2	6	4	3
		4	9	5	4

c) **Confusion around exchanging**

		7	5	9	7
-		2	8	4	3
		4	9	5	4

d) **Correct answer**

		7	5	9	7
-		2	6	4	3
		4	9	5	4

13. What error has been made?
Checks depth of understanding of written subtraction

a) The hundreds should not have been exchanged because you can take 0 hundreds away from 1 hundred
Lack of understanding of exchanging

b) The tens are wrong because they have just added 4 and 4
Right digit. Wrong reason. Pupil needs to be guided to go through the calculation themselves

c) The 9 should not have been exchanged because it had nothing to take away
Lack of understanding of exchanging

d) The tens have been exchanged by mistake. There should have been 13 tens
Correct answer

14. $8\,209\text{mm} - 5\,506\text{mm}$ *Checks understanding of subtraction involving units of measure*

a) $13\,715\text{mm}$
Added rather than subtracted

b) $3\,703\text{mm}$
Lack of understanding of exchanging mentally (hundreds)

c) $2\,703\text{mm}$
Correct answer

d) $3\,303\text{mm}$
Taking the smaller number from the bigger number in each column with no regard for working from top to bottom. Lack of understanding of the commutative law

Addition and Subtraction Diagnostic Quiz Answers

15. $22\ 2[\]4 + 8[\]253 = 1[\]3\ 217$ Checks depth of understanding of written addition

a)

	7	4	8	3
+	3	9	5	8
	1	4	4	1
	1	1	1	

 Pupil has added the numbers known in columns to get each missing number. Lack of understanding of written addition

b)

	7	4	8	3
+	3	9	5	8
	1	4	4	1
	1	1	1	

 Correct answer

c)

	7	4	8	3
+	3	9	5	8
	1	4	4	1
	1	1	1	

 Not added the carried digits. Potential exchanging issues or deeper lack of understanding of written addition

d)

	7	4	8	3
+	3	9	5	8
	1	4	4	1
	1	1	1	

 Complete lack of understanding. Likely picked at random

16. On Monday, a factory made 437 805 phones. This was 28 742 more phones than they made on Sunday. The factory then made 415 018 phones on Tuesday. How many phones were manufactured over the 3 days? Checks understanding of addition and subtraction multi-step problems in context

a) 881 565 phones
Not understood the context of the problem and has simply added all the numbers together

b) 1 261 886
Correct answer

c) 409 063 phones
Has worked out the number of phones made on Sunday, but has not answered the question

d) 824 081
Has added the two larger numbers and subtracted the smaller number - no understanding of the question

17. $[\] - 8\ 632 = 7\ 918$ Checks understanding of missing numbers in calculations

a) 714
Subtracted rather than added

b) 1 714
Subtracting incorrectly rather than adding – mistake in the decomposition of the thousand digit

c) 15 550
Forgetting to carry and add the extra 1 thousand

d) 16 550
Correct answer

Addition and Subtraction Diagnostic Quiz Answers

18. $1[]5.29\text{kg} - 39.[]1\text{kg} = 15[].98\text{kg}$
Checks understanding of missing numbers in subtraction with units of measure

- a) 98 112.29
Error in exchanging – carrying the ones digit instead of the tens digit
- b) 127 904.18
Lining up the digits incorrectly
- c) 127 902.29
Lining up digits incorrectly, but lining up decimals correctly
- d) 95 412.29
Correct answer

19. $91802.08 + 3610.21$
Checks understanding of addition with decimals including multiple placeholders

- a) 98 112.29
Error in exchanging – carrying the ones digit instead of the tens digit
- b) 127 904.18
Lining up the digits incorrectly
- c) 127 902.29
Lining up digits incorrectly, but lining up decimals correctly
- d) 95 412.29
Correct answer

20. Rhia buys a drum kit for £269.99 and a microphone for £84.45. She pays for it with £400.00. How much change will she receive?
Checks ability to calculate 2 step problems

- a) £754.44
Added all costs together. Lack of understanding of what the second step requires. Calculated correctly
- b) £45.56
Correct answer
- c) £354.44
2 steps missed. Child has calculated the first step correctly and then not subtracted to find the change
- d) £45.55
Correct method. Likely to have forgotten to adjust when adding £270 rather than £269.99. Potentially due to being a 2 step problem

Addition and Subtraction Diagnostic Quiz Answers

21. The population of Rome is 3 927 026 and the population of Milan is 5 307 508. Which answer below would be the closest estimate of the population of both the cities to the nearest 100 000?

Using estimation to check answers in context, to a degree of accuracy

- a) 9 000 000
Rounding to the nearest million instead of the nearest 100 000
- b) 9 200 000
Correct answer
- c) 9 234 534
Added both numbers without rounding
- d) 9 240 000
Rounding to the nearest 10 000 instead of the nearest 100 000

22. Each type of shape is a different number. What value is the triangle?

Checks algebra understanding in addition and subtraction context

- a) 9
Circle was found out and then applied to triangle incorrectly
- b) 41
Circle was found out and then incorrectly added to 32 to find triangle
- c) 50
Total of circles added to total of circle and triangle. Significant lack of understanding
- d) 23
Correct answer

23. £10 593 - £8 908

Checks understanding of written subtraction with multiple exchanges in a measures context

- a)

	4	0	5	9	3
-		8	9	0	8
	£	2	6	8	5

Error in exchanging 10 thousands rather than 1 thousands, to leave 9 thousands. Found difference between 10 and 8 ten thousands to compensate
- b)

	1	0	5	9	3
-		8	9	0	8
	£	2	6	8	5

Error in exchanging 10 thousands to leave 1 thousand instead of 9 thousand. Then subtracted the 1000 from the 8000 to leave 7000
- c)

	4	0	5	9	3
-		8	9	0	8
	£	1	6	8	5

Correct answer
- d)

	4	0	5	9	3
-		8	9	0	8
	£	1	6	0	5

Pupil does not take into account the non-commutative aspect of subtraction and just takes the smaller number from the larger number in each column

Addition and Subtraction Diagnostic Quiz Answers

24. 1 992.08 – 920.84

Checks understanding of subtraction with decimals including multiple placeholders

a) 1 071.24

Correct answer

b) 1 070.84

Taking the smaller number away from the bigger number in the tenths column – lack of understanding of the non-commutative aspect of subtraction

c) 8 291.24

Misaligning digits but has some understanding of decomposition. Taking the smaller number from the larger number in the thousands column

d) 1 071.04

Error with place holders

25. What is the value of m? $n - 82 = 19$, $n + m + m = 155$

Checks algebra understanding in addition and subtraction context

a) 26

Potentially simple calculation error working out n

b) 46

Calculated correctly apart from lack of understanding that n needs to be calculated by adding not subtracting 19 from 82

c) 27

Correct answer

d) 54

Correctly worked out until needing to find value of 1 m rather than 2 m. That step has been missed out

Next steps

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