

# Reasoning and Problem Solving

## Step 1: Add and Subtract Integers

### National Curriculum Objectives:

Mathematics Year 6: (6C8) [Solve problems involving addition, subtraction, multiplication and division](#)

### Differentiation:

Questions 1, 4 and 7 (Problem Solving)

**Developing** Investigate which two 5-digit numbers could have been added or subtracted in order to reach a given number.

**Expected** Investigate which two 6-digit numbers (within a given parameter) could have been added or subtracted in order to reach a given number.

**Greater Depth** Investigate which two 6-digit numbers (within a given parameter) could have been added or subtracted in order to reach a given number. Numbers represented in numerals and words.

Questions 2, 5 and 8 (Problem Solving)

**Developing** Mixture of looped subtraction and addition calculations using 5-digit numbers with three missing numbers using up to one exchange.

**Expected** Mixture of looped subtraction and addition calculations using 6-digit numbers with three missing numbers using up to two exchanges.

**Greater Depth** Mixture of looped subtraction and addition calculations in using 6-digit numbers with three missing numbers using multiple exchanges.

Questions 3, 6 and 9 (Reasoning)

**Developing** Explain whether a statement about addition and subtraction is correct. Using 5-digit numbers and up to one exchange.

**Expected** Explain whether a statement about addition and subtraction is correct. Using 6-digit numbers and up to two exchanges.

**Greater Depth** Explain whether a statement about addition and subtraction is correct. Using 6-digit numbers and multiple exchanges. Numbers represented in numerals and words.

More [Year 6 Four Operations](#) resources.

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# Add and Subtract Integers

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1a. The answer to an addition calculation using two 5-digit numbers is 65,871.

What could the calculation be?



PS

1b. The answer to a subtraction calculation using two 5-digit numbers is 37,824.

What could the calculation be?



PS

2a. Use the numbers below to fill in the blanks so the calculations are correct.

<div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;">10,129</div> + <div style="border: 1px solid green; border-radius: 15px; padding: 10px; display: inline-block; margin: 0 10px;">A</div> = <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;">30,996</div>
<div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;">+ 20,657</div>
<hr style="width: 100%; border: 0.5px solid black;"/> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;">30,786</div> - <div style="border: 1px solid green; border-radius: 15px; padding: 10px; display: inline-block; margin: 0 10px;">C</div> = <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;">18,153</div>
<div style="border: 1px solid green; border-radius: 15px; padding: 5px; display: inline-block; margin: 0 10px;">12,843</div> <div style="border: 1px solid green; border-radius: 15px; padding: 5px; display: inline-block; margin: 0 10px;">20,867</div> <div style="border: 1px solid green; border-radius: 15px; padding: 5px; display: inline-block;">12,633</div>



PS

2b. Use the numbers below to fill in the blanks so the calculations are correct.

<div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;">22,806</div> + <div style="border: 1px solid green; border-radius: 15px; padding: 10px; display: inline-block; margin: 0 10px;">B</div> = <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;">45,921</div>
<div style="border: 1px solid green; border-radius: 15px; padding: 10px; display: inline-block; margin: 0 10px;">+ A</div>
<hr style="width: 100%; border: 0.5px solid black;"/> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;">34,236</div> - <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block; margin: 0 10px;">19,656</div> = <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;">14,580</div>
<div style="border: 1px solid green; border-radius: 15px; padding: 5px; display: inline-block; margin: 0 10px;">31,341</div> <div style="border: 1px solid green; border-radius: 15px; padding: 5px; display: inline-block; margin: 0 10px;">23,115</div> <div style="border: 1px solid green; border-radius: 15px; padding: 5px; display: inline-block;">11,430</div>



PS

3a. Michael chooses a number between 10,000 and 15,000. He adds 23,154. His answer is 33,904.



My starting number is 10,650.

Is Michael correct? Explain your answer.



R

3b. Jonathan chooses a number between 25,000 and 30,000. He subtracts 10,124. His answer is 15,483.



My starting number is 25,607.

Is Jonathan correct? Explain your answer.



R

## Add and Subtract Integers

## Add and Subtract Integers

4a. The answer to an addition calculation using two 6-digit numbers is 456,782.

For one of the numbers, the thousands digit is even.

What could the calculation be?



PS

4b. The answer to a subtraction calculation using two 6-digit numbers is 130,509.

For one of the numbers, the tens digit is odd.

What could the calculation be?



PS

5a. Use the numbers below to fill in the blanks so the calculations are correct.

$$\begin{array}{r}
 \boxed{325,412} + \boxed{124,607} = \boxed{C} \\
 + \boxed{A} \qquad \qquad \qquad - \boxed{323,054} \\
 \hline
 \boxed{642,187} - \boxed{B} = \boxed{126,965}
 \end{array}$$

515,222
316,775
450,019



PS

5b. Use the numbers below to fill in the blanks so the calculations are correct.

$$\begin{array}{r}
 \boxed{A} + \boxed{482,332} = \boxed{C} \\
 + \boxed{155,010} \qquad \qquad \qquad - \boxed{122,362} \\
 \hline
 \boxed{B} + \boxed{204,960} = \boxed{521,872}
 \end{array}$$

316,912
644,234
161,902



PS

6a. Trevor chooses a number between 200,000 and 300,000. He adds 104,709 and then subtracts 210,834. His answer is 108,429.



My starting number is 214,554.

Is Trevor correct? Explain your answer.



R

6b. Jazmin chooses a number between 200,000 and 300,000. She subtracts 123,468 and then adds 156,812. Her answer is 274,216.



My starting number is 230,872.

Is Jazmin correct? Explain your answer.



R

# Add and Subtract Integers

# Add and Subtract Integers

7a. The answer to an addition calculation using two 6-digit numbers is one million, ninety-eight thousand, three hundred and fifty-four.

One 6-digit number has only even digits.

What could the calculation be?



PS

7b. The answer to a subtraction calculation using two 6-digit numbers is seven hundred and twenty-four thousand, four hundred and twenty-seven.

One 6-digit number has only odd digits.

What could the calculation be?



PS

8a. Use the numbers below to fill in the blanks so the calculations are correct.

$$\begin{array}{r}
 \boxed{497,576} + \boxed{101,464} = \boxed{C} \\
 + \boxed{B} \qquad \qquad \qquad - \boxed{451,879} \\
 \hline
 \boxed{A} - \boxed{504,070} = \boxed{147,161}
 \end{array}$$



PS

8b. Use the numbers below to fill in the blanks so the calculations are correct.

$$\begin{array}{r}
 \boxed{B} + \boxed{260,843} = \boxed{454,742} \\
 + \boxed{A} \qquad \qquad \qquad - \boxed{309,635} \\
 \hline
 \boxed{843,412} - \boxed{C} = \boxed{145,107}
 \end{array}$$



PS

9a. Darren chooses a number between 130,000 and 140,000. He adds 785,933 and then subtracts 345,785. His answer is five hundred and seventy-one thousand, four hundred and thirty-three.



My starting number is 132,285.

Is Darren correct? Explain your answer.



R

9b. Lily chooses a number between 400,000 and 410,000. She subtracts 130,982 and then adds 182,769. Her answer is four hundred and sixty thousand, one hundred and thirty-two.



My starting number is 408,345.

Is Lily correct? Explain your answer.



R

## Reasoning and Problem Solving Add and Subtract Integers

### Developing

- 1a. Various answers, for example:  $23,012 + 42,859 = 65,871$   
2a. A: 20,867; B: 12,843; C: 12,633  
3a. Michael is incorrect because  $33,904 - 23,154 = 10,750$  not 10,650.

### Expected

- 4a. Various answers, for example:  $202,836 + 253,946 = 456,782$   
5a. A: 316,775; B: 515,222; C: 450,019  
6a. Trevor is correct because  $210,834 + 108,429 = 319,263$  and  $319,263 - 104,709 = 214,554$ .

### Greater Depth

- 7a. Various answers, for example:  $849,712 + 248,642 = 1,098,354$   
8a. A: 651,231; B: 153,655; C: 599,040  
9a. Darren is incorrect because  $571,433 + 345,785 = 917,218$  and  $917,218 - 785,933 = 131,285$  not 132,285.

## Reasoning and Problem Solving Add and Subtract Integers

### Developing

- 1b. Various answers, for example:  $68,756 - 30,932 = 37,824$   
2b. A: 11,430; B: 23,115; C: 31,341  
3b. Jonathan is correct because  $14,483 + 10,124 = 25,607$ .

### Expected

- 4b. Various answers, for example:  $902,957 - 772,448 = 130,509$   
5b. A: 161,902; B: 316,912; C: 644,234  
6b. Jazmin is incorrect because  $274,216 - 156,812 = 117,404$  and  $117,404 + 123,468 = 240,872$  not 230,872.

### Greater Depth

- 7b. Various answers, for example:  $915,331 - 190,904 = 724,427$   
8b. A: 649,513; B: 193,899; C: 698,305  
9b. Lily is correct because  $460,132 - 182,769 = 277,363$  and  $277,363 + 130,982 = 408,345$ .