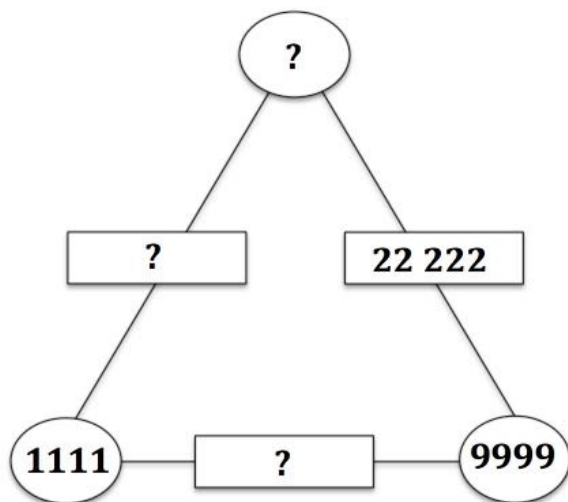


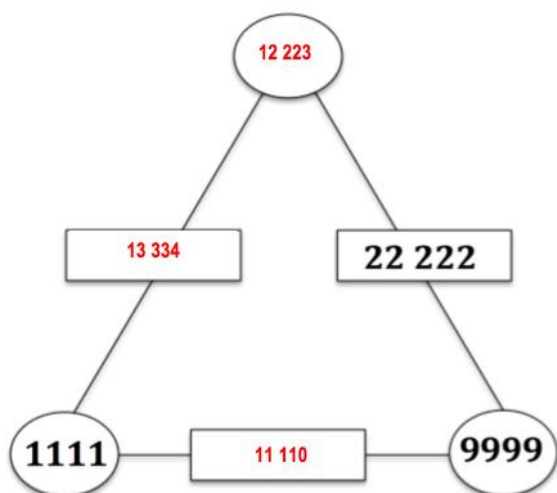
### CHECKIT



The numbers in the boxes are the sums of the numbers at the vertices.

Find the numbers to replace the question marks and check your answers by subtracting to check additions and adding to check subtractions.

### SOLUTION



$$1111 + 9999 = 11\ 110$$

$$11\ 110 - 9999 = 1111$$

$$22\ 222 - 9999 = 12\ 223$$

$$12\ 223 + 9999 = 22\ 222$$

$$12\ 223 + 1111 = 13\ 334$$

$$13\ 334 - 1111 = 12\ 223$$

## NOTES FOR TEACHERS

### Diagnostic Assessment

Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D.

	3	1		4
+				
	2		7	
<hr/>				
	5	9	6	2

Which digit can go in all boxes to make the calculation correct?



2



9



8



None of them

#### Common Misconception

I think this because 4 add 8 is 12 so you carry the one then 8 add 1 add 7 is 16 so you carry the one and 8 add 1 is 9.

<https://diagnosticquestions.com>

### Why do this activity?

This challenge changes addition and subtraction with 5 digit numbers from drill and practice into an enjoyable puzzle to solve. It also involves the use of inverse operations in a non trivial way to check the calculations and teachers can use it to reinforce the concept and of inverse operations and familiarity with the mathematical language.

### Intended learning outcomes

Practice in addition and subtraction of 5 digit numbers.

Development of problem solving skills.

Reinforcement of the concept of inverse operations to application to check calculations.

### Possible approach

Start your lesson with the diagnostic assessment. This should take about 5 minutes.

Steps for diagnostic assessment:

1. Write the question on the board and ask the class to put up 1 finger if they think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D.
2. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank them for giving the answer.
3. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
4. Ask the class **again** to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.
5. Give an explanation of why answer C is correct emphasising the place values and the reasons for 16 in the tens column being 1 hundred + 6 tens so you add 1 + 1 + 8 in the hundreds column giving the answer 6062 NOT 5962.

You could then put one of the two simpler challenges in the 'Possible support' section below on the board to make sure everyone understands what the problem involves. Give example of simple calculations to emphasise the idea of inverse operations, for example  $3 + 5 = 8$  and  $8 - 5 = 3$  shows adding 5 and subtracting 5 as inverse operations.

Then write the main challenge on the board or give learners a printed copy of the top half of page 1.

Ask the learners to work individually for about 5-10 minutes then ask them to work in groups of four to discuss their methods of finding the answers.

They should:

1. Ask “Do we all agree on the answer?”
2. Give EVERYONE in the group time to explain how they worked it out.
3. As a group, decide whose method you think is most efficient and why.

Finish with a plenary in which learners come to the board and do the calculations explaining how they found the answers and checked their solutions.

### Key questions

Can you explain how you did that calculation.

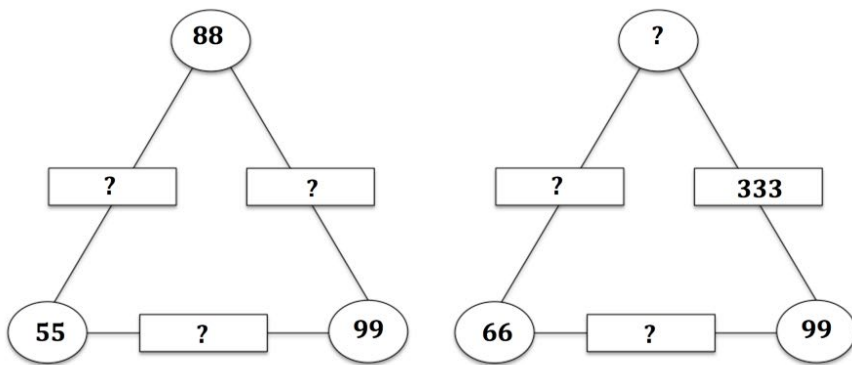
What calculation would you do to check that answer? Why?

### Possible extension

Learners can make up their own similar challenges for others to solve. They could explore the differences between using odd/even numbers in the corners.

### Possible support

Start with these simple challenges



**Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and in the USA and to Years 4 to 12 in the UK.**

	Lower Primary or Foundation Phase	Upper Primary	Lower Secondary	Upper Secondary
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6