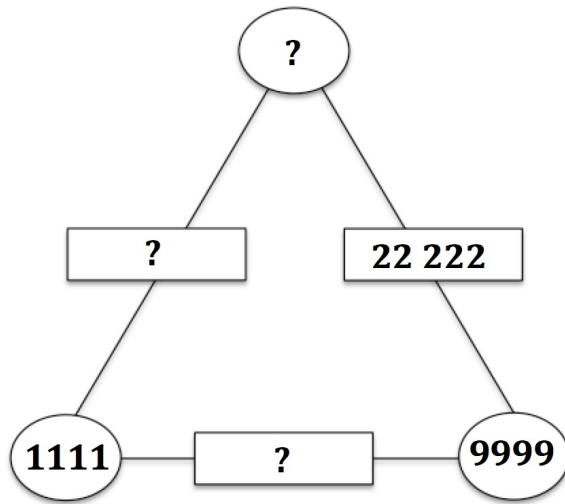


CHECKIT

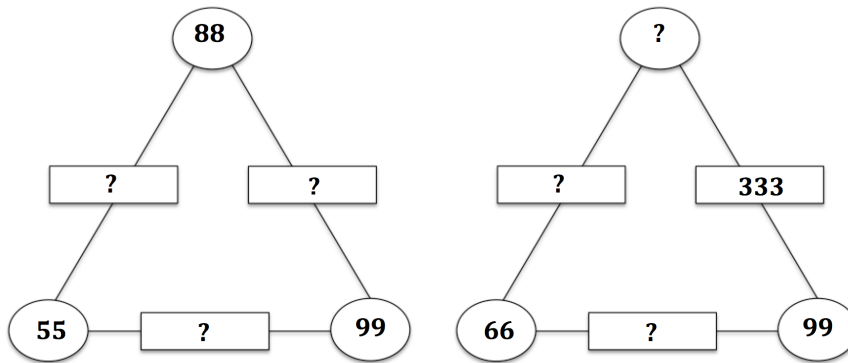


The numbers in the boxes are the sums of the numbers at the vertices.

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

HELP

Start with these simple challenges



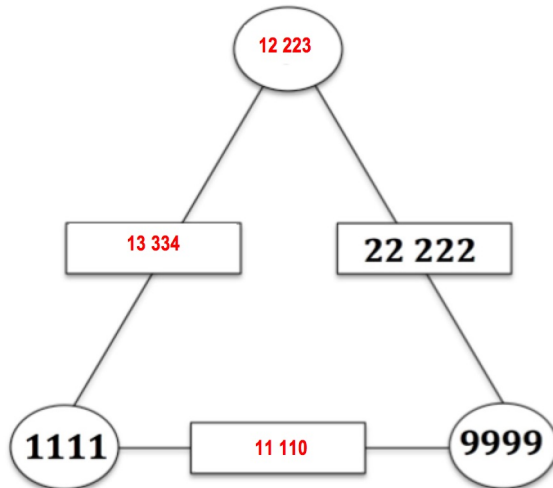
NEXT

Make up your own similar challenges for others to solve.

Explore the differences between using odd/even numbers in the corners.

NOTES FOR TEACHERS

SOLUTION



$$1111 + 9999 = 11110$$

$$11110 - 9999 = 1111$$

$$22222 - 9999 = 12223$$

$$12223 + 9999 = 22222$$

$$12223 + 1111 = 13334$$

$$13334 - 1111 = 12223$$

DIAGNOSTIC ASSESSMENT

The quiz should take about 5–10 minutes and can be used before or after the lesson.

Write the question on the board, say to the class:

“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	Which digit can go in all boxes to make the calculation correct?
+	2	□	7	□		
	5	9	6	2		

A
2

B
9

C
8

D
None of
them

1. Notice how the learners respond. Ask a learner who gave answer A to explain why he or she gave that answer. DO NOT say whether it is right or wrong, simply thank the learner the answer.

2. It is important for learners to explain the reasons for their answers. Putting thoughts into words may help them to gain better understanding and improve their communication skills.

3. Then do the same for answers B, C and D. Make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.

4. Again ask the class 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. If the concept is needed for the lesson to follow, explain the right answer or give a remedial task.

The correct answer is: D

Possible misconceptions:

A. Either learners did not understand the question or they do not understand addition.

B. Either learners did not understand the question or they do not understand addition.

C. One learner said “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.” Notice this would have been $8+1+1=10$ not 9.

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. Teachers can use it to reinforce familiarity with the mathematical language and the understanding of the concept of inverse operations.

Learning objectives

In doing this activity students will have an opportunity to:

- practice addition and subtraction of 5 digit numbers;
- develop problem solving skills;
- deepen understanding of the concept of inverse operations and its application to checking calculations.

Generic competences

In doing this activity students will have an opportunity to:

- apply knowledge and skills;
- develop the skill of interpreting and creating visual images to represent concepts;
- communicate in writing and speaking according to the audience
 - communicate, exchange ideas, criticise, and present information and ideas to others
 - analyze, reason and record ideas effectively;
- co-operate - to collaborate/work in a team, have empathy with others, listen to different points of view.

Suggestions for teaching

Start your lesson with the diagnostic assessment. This should take about 5 minutes. Give an explanation of why answer D is correct emphasising the place values. Learners need to understand why C is wrong. In the tens column 16 is 1 hundred + 6 tens so, in the hundreds column you add 1 + 1 + 8 giving the answer 6062 NOT 5962.

You could then put one of the two simpler challenges from the 'HELP' section 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 box on half page 1. To meet the learning needs of all the learners in your class, you can give some learners a copy of the HELP box and other learners a copy of the NEXT box.

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 they 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?

Follow up

TARGET 1000 <https://aiminghigh.aimssec.ac.za/years-4-7-target-1000/>

CHECKIT GAME <https://aiminghigh.aimssec.ac.za/years-4-to-10-checkit-game/>

TARGET GAMES COLLECTION

<https://aiminghigh.aimssec.ac.za/target-games-collection-suitable-for-all-ages/>

FIND THE NUMBERS <https://aiminghigh.aimssec.ac.za/years-6-7-find-the-numbers/>

OLYMPIC MAGIC <https://aiminghigh.aimssec.ac.za/years-9-12-olympic-magic/>

MATHS



TOYS

Go to the AIMSSEC AIMING HIGH website for lesson ideas, solutions and curriculum links: <http://aiminghigh.aimssec.ac.za>

Subscribe to the MATHS TOYS YouTube Channel

<https://www.youtube.com/c/mathstoys>

Download the whole AIMSSEC collection of resources to use offline with the AIMSSEC App see <https://aimssec.app> or find it on Google Play.

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and school years up to Secondary 5 in East Africa.

New material will be added for Secondary 6.

For resources for teaching A level mathematics (Years 12 and 13) see <https://nrich.maths.org/12339>

Mathematics taught in Year 13 (UK) & Secondary 6 (East Africa) is beyond the SA CAPS curriculum for Grade 12

	Lower Primary Approx. Age 5 to 8	Upper Primary Age 8 to 11	Lower Secondary Age 11 to 15	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6
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