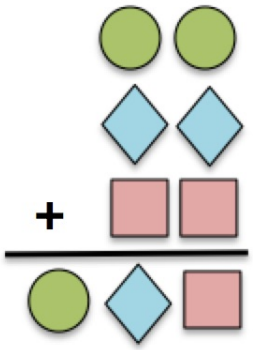


FIND THE NUMBERS

The challenge is to find numbers to replace the shapes and to make this addition sum correct.

Hint: Imagine adding up the units column. What does the red square in the units answer tell you?

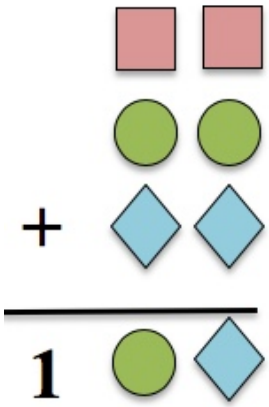
What number do you think has to go in the hundreds place? Why?

HELP

You will get most joy out of solving this puzzle on your own but if you work on it for a while and then want help you might work with a partner.

The teacher might ask a learner who has solved the first puzzle to explain it to you a learner and then you could work together on the Extension puzzle (see Next box below) to see if you can find all nine solutions. The learner who explains the ideas will benefit from doing so, but it is important that you both work together and both contribute to solving the Extension puzzle.

NEXT



In this puzzle the shapes stand for different numbers.

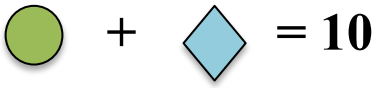
There are 9 different solutions to this puzzle whereas there was only one solution to the previous puzzle above.

Can you find the solutions?

NOTES FOR TEACHERS

SOLUTION

Adding up the units column we see that the three numbers add up to less than 20 and



so there must be **one** ten carried over to the tens column.
Adding up the tens column there must be one hundred carried over to the hundreds column so the number in the hundreds place is 1 **so the green circle is 1 and the blue rhombus is 9.**

which makes the pink square equal to 8.

```
  11
  99
+ 88
 198
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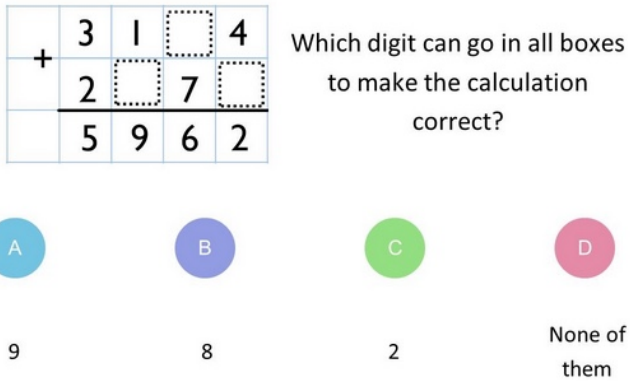
Diagnostic Assessment This should take about 5–10 minutes.

1. 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".
2. Notice how the learners responded. 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 the learner 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.** It is important for learners to explain the reason for their answer otherwise many learners will just make a guess.
5. If the concept is needed for the lesson to follow, explain the right answer or give a remedial task.



D. is the correct answer.

Common Misconceptions

A. 'I know this because 9+7=16' This learner is looking at the tens column not understanding that a ten is carried over from adding the units.

B. This answer shows that the learner did not think about the carrying over of 1 to the hundreds column but he might have checked that 8 works in the units and tens columns.

C. Probably a guess.

https://diagnosticquestions.com

Why do this activity?

This activity calls for learners to think about the process of addition and about the concept of place value. For this to be a successful learning experience a lot will depend on how well the teacher has previously helped the learners to be willing to try to work on mathematical puzzles without being told step by step what to do. In other words a teacher should try to help learners to think for

themselves and to discuss ideas with other learners in order to build on, and use, what they know. A good understanding of place value is important and this activity will consolidate the learners' understanding of place value.

In addition this is a good activity for older learners for building their confidence in problem solving. If they have a secure understanding of place value then they can focus on the logic and reasoning. To foster problem solving and mathematical thinking it is often better to make the subject content familiar.

Learning objectives

All ages: Development of mathematical thinking and problem solving skills.
Upper Primary: Development of understanding of the addition process and the concept of place value.

Generic competences

In doing this activity students will have an opportunity to:

- **think flexibly**, be creative and innovative and apply knowledge and skills;
- **persevere and work systematically** to **solve problems.**

Suggestions for Teaching

Start with the diagnostic quiz to warm up to doing this type of question. You could copy this question on the board and ask learners to work in pairs to solve it. If possible go around the class asking key questions to assist the learners but being careful not to tell them what to do.

Learners who find a solution might be asked to try the Possible Extension puzzle or to make up their own similar problem for other learners to solve.

At some point ask pairs of learners to come to the board to explain how they found the solution.

It is likely that many learners will use a combination of trial and improvement with mathematical thinking. So it is very important to stress that to be able to explain the method of solution is more important than simply finding the answer.

Key Questions

Imagine adding up the tens column. What number do you think has to go in the hundreds place?
Imagine adding up the units column. What is happening?
Do you know any of the numbers yet?
Can you explain how you found that number?
Have you checked your answer?

Follow up

https://aiminghigh.aimssec.ac.za/years-7-8-whats-it-worth/

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