

Pooch police

Setting the context

Dear Scottie

The problem of dog congestion is getting worse. Since that new housing estate was built, the number of dogs on the field has quadrupled. There are so many dogs now that we all have to stay on our leads – we just walk around in one big line behind each other. It's like a dog traffic jam.

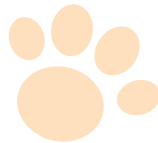
Anyway, I'm delighted that a new law has been passed so we can all enjoy the field again. Terriers can only go out on Monday, Wednesday and Friday and dogs bigger than terriers go out on Tuesday, Thursday and Saturday. Sunday is clean-up day. They've even got Pooch Police on the field to make sure that no one breaks the law. If you do you get a fine – you have to solve some problems. If you don't solve them then it's a night in the kennels.

Guess what? I got caught. I just nipped out for a little break (if you know what I mean) and the next thing I knew I was down the Pooch Station in a kennel. They gave me the 999 problem. I might be here for some time. Can you help me? I've had a go at one already:

$$537 + 462 = 999$$

Yours

Jack Russell



Problem

Make ten addition calculations with a total of 999, using the numbers 1–9.



Objectives

To solve mathematical problems and puzzles.
To recognise and explain patterns and relationships.

You will need

Paper and pens.

Preparation

Write out six solutions on the board, covered.

Solving the problem

- Read the story and the problem.
- Ask the children a number of questions related to the number nine to get them warmed up: *What is a nine-sided shape called? (A nonagon or an enneagon.) How many factors does nine have? (Three – 1, 3 and 9.) How many nines in 999? (111) Add*

ninety-nine and nine, then find the digital root. (99 + 9 = 108; 1 + 0 + 8 = 9.) How would you write the number nine in Roman numerals? (IX) How many seconds in nine minutes? (540) What do you get if you add the numbers from 1 to 9 together? (45)

- Look at the addition Jack Russell has completed. Is it right? Can the children spot any patterns? (All the numbers on the top are odd and all those on the bottom are even.)
- Before moving on to other solutions, freeze-frame the addition and look at the different parts of the sum.
- Set the problem, awarding nine points for each addition found that equals 999. Can the children find more than six?
- Give children the time to work through some solutions before looking at the variations produced. Has anyone worked out