

The Mystery Decimal Ticket

This brain teaser asks you to use what you know about place value, decimal numbers, and fractions to track down one hidden number. In Grade 4 you learn that decimal numbers are fractions with denominators of 10, 100, and so on ([Skills](#), [Knowledge](#)), that each place value is worth one-tenth of the place to its left ([Knowledge](#)), and that you can compare and order decimal numbers using less than, greater than, and equal to ([Skills](#)). You also practise simplifying fractions by dividing the numerator and denominator by a common factor ([Skills](#)). Put those skills together to solve the case below.



Figure 1: A cheerful classroom scene showing a large paper ticket pinned to a corkboard, covered in fraction and decimal clues written in chalk, with

The puzzle

A snack-bar ticket has a secret decimal number printed on it, somewhere between 0 and 1. Four clues about the number survived a spill of juice. Find the number using all four clues together.

Clue 1: Written as a fraction with a denominator of 100, the number's numerator is a two-digit number whose digits add up to 9.

Clue 2: The number is greater than $\frac{3}{10}$ and less than 0.4.

Clue 3: The digit in the hundredths place is double the digit in the tenths place.

Clue 4: If you add 0.05 to the number, the result is still less than half of one dollar (0.50).

What is the secret decimal number? Write it as a decimal, then express it as a fraction in simplest form.

Hints

Hint 1: Clue 2 tells you the tenths digit right away. Between 0.3 and 0.4, only one digit can sit in the tenths place.

Hint 2: Once you know the tenths digit, use clue 3 to work out the hundredths digit. Remember, "double" means multiply by 2.

Hint 3: Put the two digits together to build a number between 0.30 and 0.40, then check it against clue 1 by adding its digits, and against clue 4 by adding 0.05 to see if the sum stays under 0.50.

Answer key

The secret number is 0.36.

Reasoning:

Clue 2 says the number is greater than $\frac{3}{10}$ (which is 0.3) and less than 0.4. That means the tenths digit must be 3, since the hundredths numbers from 0.31 up to 0.39 are the ones greater than 0.3 and less than 0.4.

Clue 3 says the hundredths digit is double the tenths digit. Double of 3 is 6, so the hundredths digit is 6. That gives the number 0.36.

Clue 1 checks out: as a fraction with denominator 100, 0.36 is $\frac{36}{100}$, and the digits of 36 add up to $3 + 6 = 9$.

Clue 4 checks out: $0.36 + 0.05 = 0.41$, which is less than 0.50.

As a fraction in simplest form, $\frac{36}{100}$ can be divided by the common factor 4 in both the numerator and denominator, giving $\frac{9}{25}$ ([Skills](#)).