Math Diversion Problem 556

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May 4, 2025

> We won't be bullied into an
> answer we don't like.
> — John Baez
> (John Baez on the number 24)

The YouTube video is found at:

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Source: https://www.youtube.com/watch?v=1vWDGOTibB4
Title: Germany | can you solve this ?
 Presenter: MathMastery_Minds
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1 The Problem

Given the relation

$$4^n + 3^n = 91\,, \tag{1}$$

find the real values of n.

2 The Solution

Let's begin with the assumption that we might have integer solutions.

n	4^n	3^n	$4^n + 3^n$
2	16	9	25
3	64	27	91 ✓

Table 1: Heuristic: Solved by Table.

Hence, our solution is:

$$n = 3\,. \tag{2}$$

And, as the function $f(n) = 4^n + 3^n$ is a monotonically increasing function of n, we expect only one solution.