

Math Diversion Problem 852

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With me, everything turns into mathematics.

— Rene Descartes

(P.S. I calculate; therefore I am.)

Source: YouTube

Title: A Table Problem

Presenter: Math Olympiad

1 Problem

Given the relation

$$3^z - 2^z = 65, \tag{1}$$

find the integer solutions of z .

2 Solution

Given that we are tasked only to find integer solutions to (1), we should try to solve it by use of a table. My first guess was $z = 5$.

z	3^z	z^z	$3^z - 2^z$
5	243	32	211
4	81	16	65

Table 1: These types of problems rarely require large values.

After 5 didn't work, I guessed one lower. The answer is $z = 4$.