

Math Diversion Problem 485

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Average talent, plus hard work and dedication,
will always beat talent by itself.
— Clinton Anderson

The YouTube video is found at:

Source: <https://www.youtube.com/watch?v=tHU4WUh-CIE>
Title: A Nice Diophantine Equation
Presenter: aplusbi

1 The Problem

Given the relation

$$x^4 = 4^x + 17, \tag{1}$$

find the integer values of x .

2 The Solution

Since we are looking for only integer solutions to (1), it seems natural enough to try a table

x	x^4	$4^x + 17$
2	16	$16 + 17 = 33$
3	81	$64 + 17 = 81 \checkmark$

Table 1: An integer solution does exist!

If x were instead a real variable, it would be a lot more interesting.