Math Diversion Problem 137

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Abstract

Here we use the unipodal algebra to assist in solving the problem, which is given to us on YouTube. Although I'm referring to the series under the name 'olympiad', the problems are from diverse sources as olympiads, entrance exams, SATs, and the like.

Learning is a treasure that will follow its owner everywhere.
— Chinese proverb

The YouTube video is found at:

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Source: https://www.youtube.com/watch?v=nZmxQYLaH2g
Title: Germany | Can you solve this?
 Presenter: Master T Maths Class
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1   The Problem

Given the relation

$$25^{2x} = 50 \,, \tag{1}$$

find the values of x over the real numbers.

2   The Solution

The first thing I did was to simplify a bit.

$$25^{2x-1} = 2 \,, \tag{2}$$

or

$$5^{4x-2} = 2 \,. \tag{3}$$

Then

$$4x - 2 = \frac{\log 2}{\log 5} \,, \tag{4}$$

and therefore

$$x = \frac{1}{4} \left(\frac{\log 2}{\log 5} + 2 \right) \,. \tag{5}$$