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.

"Can I have a motorcycle when I get old enough?"
"If you take care of it."
"What do you have to do?"
"Lot's of things. You've been watching me."
"Will you show me all of them?"
"Sure."
"Is it hard?"
"Not if you have the right attitudes. It's having the right attitudes that's hard."
— Robert Pirsig to his son, from *Zen and the Art of Motorcycle Maintenance*

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

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