

# Math Diversion Problem 652

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Young men should prove theorems, old  
men should write books.  
— G.H. Hardy

The YouTube video is found at:

Source: <https://www.youtube.com/watch?v=vR9vb8qQpuA>  
Title: A very Interesting Exponential Problem  
Presenter: Math Beast

## 1 The Problem

Given the relation

$$2^{2^x} = 16^{2^{3x}}, \quad (1)$$

find the values for  $x$ .

## 2 The Solution

The Given relation can be rewritten as

$$2^{2^x} = 2^{4 \cdot 2^{3x}}. \quad (2)$$

So, equate exponents.

$$2^x = 4 \cdot 2^{3x} = 2^{3x+2}. \quad (3)$$

Equate exponents again.

$$x = 3x + 2. \quad (4)$$

Solving this, we get

$$x = -1. \quad (5)$$