# Math Diversion 998

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> You don't understand anything until you
> learn it more than one way.
> — Marvin Minsky

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Source: https://www.youtube.com/watch?v=CRfYk9LUBng
Title: Math Algebra Solution
 Presenter: Sifat Math Hospital
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## 1 Problem

Given the relation

$$x^{x^{73}} = 73\,, \tag{1}$$

solve for real values of $x$.

## 2 Solution

This is one of those problem where an $\alpha$ transformation looks good to try. So, let

$$x = 73^{\alpha}\,. \tag{2}$$

Substituting into (1), we get

$$(73^{\alpha})^{(73^{\alpha})^{73}} = 73\,, \tag{3}$$

which becomes

$$73^{\alpha 73^{\alpha 73}} = 73^{1}\,. \tag{4}$$

On setting the exponents equal, we have that

$$\alpha 73^{\alpha 73} = 1\,. \tag{5}$$

Solving this by inspection, we get

$$\alpha = 1/73\,. \tag{6}$$

Hence,

$$x = (73)^{1/73}\,. \tag{7}$$