

Math Diversion 1009

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You cannot ask us to take sides against arithmetic.

— Winston Churchill

Source: <https://www.youtube.com/watch?v=J6EgujRX0ss>

Title: Can you Evaluate? | Calculator Not Allowed

Presenter: Math Beast

1 Problem

Given the relation

$$\phi = 2.25^{2.25}, \quad (1)$$

re-express ϕ without decimals.

2 Solution

Since it's true that

$$1.5^2 = 2.25, \quad (2)$$

and that

$$1.5 = \frac{3}{2}, \quad (3)$$

then

$$\begin{aligned} \phi &= \left(\left(\frac{3}{2}\right)^2\right)^{2.25} \\ &= \left(\frac{3}{2}\right)^{4.5} \\ &= \left(\frac{3}{2}\right)^4 \left(\frac{3}{2}\right)^{1/2} \\ &= \frac{81}{16} \sqrt{\frac{3}{2}}. \end{aligned} \quad (4)$$