

#0 Alpha Ciphering
MA@ National Convention 2017

Simplify

$$\left(\sqrt[3]{71} - \sqrt[3]{65}\right)\left(\sqrt[3]{5041} + \sqrt[3]{4615} + \sqrt[3]{4225}\right)$$

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Find the value(s) of a such that the system of equations has no real solution.

$$\begin{cases} x+2y-3z=4 \\ 3x-y+5z=2 \\ 4x+y+(a^2-14)z=a+2 \end{cases}$$

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$$\log_a(10) + \dots + \log_a(10^n) + \dots + \log_a(10^{10}) = 110.$$

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Simplify $\ln\left[-(i \cos 1 + \sin 1)^2\right]$, where the natural logarithm is defined over the complex numbers and the imaginary part of the value is as close to 0 as possible.

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#9 Alpha Ciphering
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The coefficients of the third and eleventh terms of the expansion of $(a+b)^n$ are the same (when the terms are written in descending power of a and n is a positive integer). Find the sum of the coefficient of the fifth term and all positive integral divisors of that coefficient.

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