NMU Math & CS Department

Problem of the Month, March/April 2024

Imagine combining **four** whole numbers a, b, c, d, by composing **three** algebraic operations, where the possibilities for the operations are: addition, subtraction, multiplication, or division. Exponentiation is not allowed.

For example, you can produce expressions like $\dfrac{(ab)c}{d}$, or $\dfrac{a}{b} - \dfrac{c}{d}$, or $\dfrac{(a-b)c}{d}$, or $\dfrac{ab}{c-d}$.

Expressions like $a^b - cd$ or $a^{b+c} - d$ are not allowed, since they involve exponentiation.

Suppose that the values for a, b, c, d are drawn from the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$; how close can you get to *Euler's number* from calculus $e \approx 2.7182...$?

For example, $\dfrac{9 - \frac{1}{3}}{3} = 2.\overline{8}$ and $\dfrac{3}{2+3} + 2 = 2.6$ are on target, but it is possible to get even closer to e than those!

How close can you get?