

A pure and an applied mathematician

by Gonit Sora - Thursday, April 21, 2011

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A pure and applied mathematician are asked to calculate $2 * 2$.

The applied mathematician's solution:

We have,

$$2 * 2 = 2 * 1 / (1 - 1/2).$$

The second factor on the right hand side has a geometric series expansion

$$1 / (1 - 1/2) = 1 + 1/2 + 1/4 + 1/8 + \dots$$

Cutting off the series after the second term yields the approximate solution

$$2 * 2 = 2 * (1 + 1/2) = 3.$$

The pure mathematician's solution:

We have,

$$2 * 2 = (-2) * 1 / (1 - 3/2).$$

The second factor on the right hand side has a geometric series expansion

$$1 / (1 - 3/2) = 1 + 3/2 + 9/4 + 27/8 + \dots,$$

which diverges.

Hence, the solution to $2 * 2$ does not exist.

Collected by Xongkhya Das.

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