# Express Riddler

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## Riddle:

I recently came across a rather peculiar recipe for something called Babylonian radish pie. Intrigued, I began to follow the directions, which said I could start with any number of cups of flour.

*Any* number? I mean, I had to start with *some* flour, so zero cups wasn't an option. But according to the recipe, any positive value was fair game. Next, I needed a second amount of flour that was 3 divided by my original number. For example, if I had started with two cups of flour, then the recipe told me I now needed 3 divided by 2, or 1.5, cups at this point.

I was then instructed to combine these amounts of flour and discard half. Apparently, this was my new starting amount of flour. I was to repeat the process, combining this amount with 3 divided by it and then discarding half.

The recipe told me to keep doing this, over and over. Eventually, I'd have the proper number of cups of flour for my radish pie.

How many cups of flour does the recipe ultimately call for?

## Solution:

If the amount of flour does indeed converge, then the starting and ending amount of flour in subsequent iterations is the same. If that amount of flour is $x$, then this can be expressed as

$$\frac{\left(x + \frac{3}{x}\right)}{2} = x$$

The positive solution to this equation is $\boxed{\sqrt{3}}$. I do not know how to prove that the solution converges.