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Let d be the number of digits in b . We have:

$$\begin{aligned}10^d a + b &= (a + b)^2 \\ b^2 + (2a - 1)b + a^2 - 10^d a &= 0 \\ b &= \frac{1 - 2a + \sqrt{4 \cdot 10^d a - 4a + 1}}{2}\end{aligned}$$

Similarly:

$$a = \frac{(10^d - 2b) + \sqrt{10^{2d} - 4 \cdot 10^d b + 4b}}{2}$$

Then search through the numbers up to half of the required length, where the corresponding other number is obtained using the formulas.