Calculus II
Decimal notation to rational number

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Example

Write the number $2.3\overline{17} = 2.3171717\ldots$ as a quotient of integers.
$$2.3171717\ldots = 2.3 + \frac{17}{10^3} + \frac{17}{10^5} + \frac{17}{10^7} + \cdots$$

- After the first term, we have a geometric series.
- $a = \frac{17}{10^3}$ and $r = \frac{1}{10^2}$.

$$\begin{aligned}
2.3171717\ldots &= 2.3 + \frac{\frac{17}{10^3}}{1 - \frac{1}{10^2}} = 2.3 + \frac{\frac{17}{1000}}{\frac{99}{100}} \\
&= \frac{23}{10} + \frac{17}{990} = \frac{1147}{495}
\end{aligned}$$