Decimal Expansion

The decimal expansion of a rational number eventually becomes periodic. As a warm up, prove this. The assignment is to investigate the period of the decimal expansion of $\frac{1}{p}$, when p is a prime number.

Assignment

1. Compute the decimal expansions of $\frac{1}{p}$ for $p < 100$.

2. Explain the period of the decimal expansion of p^{-1} in terms of modulo p arithmetic.

3. Try to describe how the period varies with p probabilistically.

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