Decimals

$\frac{1}{2} = 0.5$

$\frac{1}{4} = 0.25$

$\frac{1}{8} = 0.125$

$\frac{1}{16} = 0.0625$

$\frac{1}{32} = 0.03125$

$\frac{1}{2^n} = \frac{5^n}{10^n}$

$2^n \cdot 5^n$

$\frac{1}{5^n} = \frac{2^n}{10^n}$

$\frac{2^a 5^b}{n}$ How many digits: $\frac{n}{2^a 5^b}$ $\max(a,b)$

$\frac{2^2 5^3}{3}$

$\frac{3}{2^2 5^3} = 0.006 = \frac{6}{1000}$

~ 500

Repeating Decimals

$\frac{1}{3} = 0.\overline{3}$

$$
\begin{array}{r}
0.3333\ldots \\
3\overline{)1.0} \\
-0.9 \\
\hline
10 \\
-9 \\
\hline
10 \\
-9 \\
\hline
1
\end{array}
$$

$\frac{1}{6} = 0.166666\ldots$

$= 0.1\overline{6}$

$\frac{1}{7} = 0.142857142857142857\ldots = 0.\overline{142857}$

$\frac{1}{12} = 0.08\overline{3}$

$$
\begin{array}{r}
0.0833\ldots \\
12\overline{)1.00} \\
-96 \\
\hline
40 \\
-36 \\
\hline
40 \\
-36 \\
\hline
4
\end{array}
$$

Find the smallest n s.t. $\frac{10^n}{12}$ reduces to a frac. with denom that's divisible by neither 2 nor 5

$$\frac{10^n}{2^2 \cdot 3}$$

$n=1$ $\quad \frac{10}{2^2 \cdot 3} = \frac{2 \cdot 5}{2^2 \cdot 3}$

$n=2$ $\quad \frac{2^2 \cdot 5^2}{2^2 \cdot 3}$

$\frac{a}{b}$ this terminates if and only if b has only 2s and 5s in its prime factorization