Epic Proof of Le Based Boy Undergrad Number Theory Problem

Jew Destroyer 6 Gorillion

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For $m, n \in \mathbb{N}$ we write $m|n$ if m divides n. Let $n \in \mathbb{N}$ be an integer such that

$$\sum_{d|n} d = k.$$

Now observe that for any divisor $d|n$ there exists a $d'|n$ such that $d = \frac{n}{d'}$, namely $d' = \frac{n}{d}$. We then have

$$\sum_{d|n} d = \sum_{d|n} \frac{d}{n}.$$

Given that $\frac{1}{d} = \frac{(n/d)}{n}$ it follows that

$$\sum_{d|n} \frac{1}{d} = \sum_{d|n} \frac{(n/d)}{n} = \sum_{d|n} \frac{d}{n} = \frac{k}{n}.$$

For $n = s$ and $k = 2280960$, this yields

$$\sum_{d|s} d = \frac{2280960}{s}.$$