PROBLEM OF THE WEEK #1
(Spring 2018)

The perfect powers form a multiset

$$P = \{2^2, 2^3, 2^4, \ldots, 3^2, 3^3, 3^4, \ldots, 4^2, 4^3, 4^4, \ldots\}.$$

A multiset is just like a set, except that elements can occur multiple times. For example, $64 = 2^6 = 4^3 = 8^2$, so 64 appears three times in P.

Find the sum of the reciprocals of the perfect powers: $\displaystyle\sum_{n \in P} \frac{1}{n}$.

To be clear, the term $\frac{1}{64}$ appears three times in this sum.

[Please fully explain your answer.]

Solutions should be submitted to Cinda Furry, in Gardner Hall 435, by 4:00 P.M. on Wednesday, January 31, 2018.