Because we are given , to find all the correct values of fractions , we only need to find E. Because and E are all greater than 1, the possible value of E is 1, 2, …… for all . Since E is equal for all , the possible value of E is 1, 2, …… . Otherwise, if E exceed , , which is impossible. To determine is E the exact value we are finding, we calculate and compare it with S. If calculated sum is smaller, our calculated is too big, E is smaller than the correct value and vice versa.

We can start finding E from a random number E’s range. Then keep doing binary searches in E’s range to find out the exact E. Instead of comparing with the median, we use above method to determine whether the value is too big or too small or exact.