Let m denote the number of queries, and U denote the largest integer value. Suppose the number k has factorization $k = \prod_i p_i^{q_i}$, then the solution is $\prod_i \binom{n+q_i-1}{n-1}$, because we can consider each prime factor independently. $\tilde{O}(U+m)$ by sieve or $\tilde{O}(m+\sqrt{U})$ [1].

References

[1] Karl Bringmann and Philip Wellnitz. On near-linear-time algorithms for dense subset sum. In *Proceedings of the 2021 ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 1777–1796. SIAM, 2021.