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Prime Gap

Gaps between primes does not follow any pattern.

Gaps between two primes can be infinite. Since twin primes occur infinitely too, gap of size 1 also occurs infinite times.

For a particular N , there are many prime gaps below it. Let us call the largest prime gap below N , Maximal Prime Gap. The table below lists the first occurrence of Maximal Prime Gaps.

Gap of Length	First Occurrence
0	2
13	$113 > 10^2$
111	$370261 > 10^5$
131	$1357201 > 10^6$
179	$17051707 > 10^7$
221	$122164747 > 10^8$
287	$1294268491 > 10^9$
581	$1346294310749 > 10^{12}$
1131	$1693182318746371 > 10^{15}$
1475	$1425172824437699411 > 10^{18}$

Resources: [Wiki](#) | [The Gaps Between Primes](#)

Application

This knowledge is useful when solving the "Next Prime" problem. Combined with a Primality Testing Algorithm, we can accurately calculate the complexity of finding the next prime bigger than N .