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The number of prime factors of n(n+2)(n+6)

It is believed that there should be infinitely many integers n for which n, $n+2$ and $n+6$ are all primes. Unfortunately proving this seems to be well beyond our current capabilities.

We will show that there are infinitely many integers n for which n, $n+2$ and $n+6$ together have at most 7 prime factors in total. Our key new idea is a switching principle which allows us to combine sieves of different dimensions to get stronger estimates than were previously available.