

# \*Prime number races\*

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007 Kemeny Hall, 4:00 pm  
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## Abstract

This talk is a survey of “prime number races”. Chebyshev noticed in the first half of the nineteenth century that for any given value of  $x$ , there always seem to be more primes of the form  $4n+3$  less than  $x$  than there are of the form  $4n+1$ . Similar observations have been made with primes of the form  $3n+2$  and  $3n+1$ , primes of the form  $10n+3$ ,  $10n+7$  and  $10n+1$ ,  $10n+9$ , and many others besides. More generally, one can consider primes of the form  $qn+a$ ,  $qn+b$ ,  $qn+c$ ,  $\dots$  for our favorite constants  $q, a, b, c, \dots$  and try to figure out which forms are “preferred” over the others – not to mention figuring out what, precisely, being “preferred” means. We describe these phenomena in greater detail and explain the efforts that have been made at understanding them.