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Results on the $3x + 1$ and $3x + d$ Conjectures,
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Abstract

We give results relating to the $3x+1$ and $3x+d$ conjectures, proposed by Collatz and Lagarias, respectively. We prove two theorems about the Primitive Cycles Existence Conjecture, which give a sufficient condition for which a primitive cycle will exist for a positive integer d , and list the first few primitive cycles found using this condition.