

## MAS3008 NUMBER THEORY

### SOME STATISTICS ON PRIMES & PSEUDOPRIMES ETC

Up to  $25 \times 10^9$  there are:  
just over  $10^7$  primes;  
21 853 pseudoprimes to base 2;  
2 163 Carmichael numbers.

There are only  
4 842 strong pseudoprimes to base 2 (e.g.  $2047 = 23 \times 89$ );  
184 strong pseudoprimes to bases 2 and 3 (e.g. 1 373 653);  
13 strong pseudoprimes to bases 2, 3 and 5;  
1 strong pseudoprime to bases 2, 3, 5 and 7;  
no strong pseudoprimes to bases 2, 3, 5, 7 and 11.

One can show that if  $n$  is composite then  $n$  is a strong pseudoprime for at most  $1/4$  of the possible bases  $a$  with  $1 < a < n$ . (See K.H. Rosen: *Elementary Number Theory and its Applications*, 3rd edition, Theorem 5.10, p.197 and p.302).

Thus there are no “strong Carmichael numbers”.

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