

**MATH 467 FACTORIZATION AND PRIMALITY**  
**TESTING, FALL 2024, PROBLEMS 10**

*Return by Monday 4th November*

Submit any code you write to answer these questions.

1. The Martian year is approximately 668 Martian days. Compute the probability  $\rho(s)$  for a class of  $s$  Martian students when  $21 \leq s \leq 50$ . For which size class of Martians is one more likely than not to have two Martians with the same birthday?

For a Mercurian the solar day appears to be longer than the solar year, so sadly on Mercury the human concept of birthday does not make sense.

2. Write a programme to implement Pollard's " $\rho$ " and use it to factorise

(i) 3215031751,

(ii) 9912409831,

(iii) 341550071728321,

(iv) 3825123056546413051,

(v) 1296001987165015643369032371289.

3. Write a programme to implement Pollard's " $p - 1$ " and use it to factorise

(i) 1231331,

(ii) 950161333249.