

**MATH 467 FACTORIZATION AND PRIMALITY
TESTING, FALL 2025, PROBLEMS 12**

Return by Monday 17th 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 “ ρ ” 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.