Quiz 3

1. True or false?

   (a) Any collection of three or more integers must contain two integers of the same parity.

   (b) For any fixed n, the sequence of binomial coefficients $\binom{n}{k}$ is monotonically increasing in k.

2. Prove that in any group of 800 people at least three must share a birthday.

3. Prove that for any prime p and any integer $0 \leq k \leq p$, the binomial coefficient $\binom{p}{k}$ is divisible by p.