# 1 Guess the Polynomial

Remember the mantra "$d + 1$ points uniquely determine a degree $\leq d$ polynomial ($d \in \mathbb{N}$)"?

Your TA will write down a secret polynomial (of any degree) with non-negative, integer coefficients. You should then guess the exact polynomial they have written down, using only information about the polynomial at two points!

# 2 Which Envelope?

You have two envelopes in front of you containing cash. You know that one envelope contains twice as much money as the other envelope (the amount of money in an envelope is an integer). You are allowed to pick one envelope and see how much cash is inside, and then based on this information, you can decide to switch envelopes or stick with the envelope you already have.

Can you come up with a strategy which will allow you to pick the envelope with more money, with probability strictly greater than $1/2$?

# 3  Airplane Seating

You are the last of 100 passengers lining up to board an airplane with 100 seats. The *i*th passenger in line is assigned to seat number *i*. The first passenger sits in a seat chosen uniformly at random. Every other passenger in line will sit at their assigned seat if available or they will sit in a seat uniformly at random otherwise. What is the probability that you get to sit in your assigned seat (seat number 100)?