Problem 1:

A tank contains 100 gal of brine may by dissolving 80 lb of salt in water. Pure water runs into the tank at the rate of 4gal/min and the mixture, which is kept uniform by stirring, runs out at the same rate. Find the amount y(t) of salt in the tank at any time t.

Problem 2:

For a continuous and onto function F from [0,2] to [0,4]. Show that F(x) = 2x for some .

Problem 3:

2011 students standing in a row, each of a different height. In how many ways can you arrange them such that there are never three of them (not necessarily next to each other) with the tallest in the middle? Explain.