MA 391 ASSIGNMENT # 2

Answers to problems may be handwritten.

(1) The Supreme Court of the United States will consider a case if at least 4 of the 9 justices deem it worthy of further consideration. Explain how this corresponds to a weighted yes-no voting system with quota less than half the sum of the weights.

(2) A yes-no voting system is said to be *monotone* if adding voters to a winning coalition again yields a winning coalition. Explain why, in a monotone system, every voter belongs to at least half of the winning coalitions. Show that a voter has no political power if and only if they belong to *exactly* half of the winning coalitions.

(3) Show that if a weighted voting system is altered by giving veto power to some of the voters, then the resulting yes-no voting system is again a weighted voting system.

(4) Suppose that 5 people are seated at a circular table, and we form a yes-no voting system by declaring a coalition to be winning if it contains at least 3 people seated next to one another. List the minimal winning coalitions and then determine if this system is swap robust. Is this a weighted voting system?