**Problem:** Three hundred men sit around a circular table. The men are numbered 1–300 and each man has two neighbors. (The neighbors of 1 are 2 and 300, and the neighbors of 300 are 1 and 299.)

There are three hundred waiters, also numbered from 1 to 300. Each waiter has an urn containing three balls, one lettered L, one C and one R. Each waiter \( y \) draws a ball at random from his urn and if the ball is lettered L, delivers a dessert to the man to the left of man \( y \). If the letter is C man \( y \) gets the dessert, and if the letter is R the man to the right of man \( y \) gets the dessert. Call a man lucky if he gets three desserts. Find the greatest possible number of lucky men, and the probability that this many men are lucky.

**Solution:** (by Landon Lehman, Senior, Physics, Purdue University)

It is possible for every third man to get three desserts, and so the maximum number of lucky men is \( 300/3 = 100 \). But the condition of every third man getting three desserts can be achieved in three distinct ways: (1) the men numbered 1, 4, 7, 10, \ldots, 298 each get three desserts, (2) the men numbered 3, 6, 9, 12, \ldots, 300 each get three desserts. Since each of these distinct ways requires every one of the 300 waiters to do something he has a 1 out of 3 chance of doing, each way has a probability of \( 1/3^{300} \). But since there are three ways, the probability that 100 men are lucky is \( 3(1/3^{300}) = 1/3^{299} \).

The problem was also solved by:

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