Addendum to Homework #12

This addendum contains three additional problems on CLT. Quiz#6 on Tuesday, May 3, will be based on Homework#12 and these additional problems.

1. In Problem 7(b) of Homework#11 (the cricket problem) you were asked to find the smallest n for which the Chebyshev inequality guarantees that $P(|X(n)| \geq n) \leq \frac{1}{3}$. Now use CLT to find (approximately) the smallest n for which $P(|X(n)| \geq n) \leq \frac{1}{3}$. Does it make sense to use histogram correction in this problem? Explain why.

2 (Durrett 6.45) A die is rolled repeatedly until the sum of the numbers obtained is larger than 200. What is the probability that you need more than 66 rolls to do this? **Note:** You need a trick to set up this problem. A similar trick is used in one of the examples in [BT,§ 5.4].

3 (Durrett 6.41). On each bet a gambler loses $1 with probability 0.7, loses $2 with probability 0.2, and wins $10 with probability 0.1. Estimate the probability that the gambler will be losing after 100 bets.