Math 148 Quiz Seven Version C

Name:

Answer the following questions:

1. (4 points) A box contains numbered tickets.
(a). Draws are made at random with replacement from the box.
(b). For a certain number n of draws, the expected value of the sum S_n of those n draws is $E(S_n) = 300$.
(c). For that same number of draws, there is a 75% chance that the sum of the draws S_n is between 250 and 350.

Is the following statement true or false? Explain briefly your response.
There is about a 75% chance that the sum S_{2n} of twice as many draws is between 500 and 700.

False.The EV for S_{2n} increases to 600, but the SE increases to $\sqrt{2}$SE.
Therefore, the 75% confidence interval should be shorter than (500,700)

2. (8 points) 400 draws are made at random with replacement from the box $\vec{b} = [1, 3, 5, 7, 9]$.

(a). Estimate the probability that the sum of the draws S_{400} will be more than $1,500$.
(b). Estimate the probability that the number 3 will be drawn fewer than 90 times.

(a)EV= $400 \times 5 = 2000$
SE=$\sqrt{400}\times$ SD=56.57
SU=$\frac{1500-2000}{56.57} = -8.83$
The probability is approximately 100%

(b)EV= $400/6 = 66.67$
SE=$\sqrt{400} \times \sqrt{1/6 \times 5/6} = 7.45$
SU=$\frac{90-66.67}{7.45} = 3.13$
The probability is approximately 0.08%

3. (3 points) A pair of fair dice is tossed once. A correct box model for the sum of the dots is

(a). The sum of two draws with replacement from the box [1, 2, 3, 4, 5, 6]
(b). One draw from the box [2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12].

Only one of the above is true. Select the correct statement, and explain your reasoning.

(a) is true. The probability that the sum is 2 is 1/36 and the probability that the sum is 3 is 2/36, but in (b) they are equal 1/11.
Thus,it cannot be (b).