name : _____

section : 109

GSI : Charles Wang

(2 pts) Circle True or False. (+1 for correct, 0 for blank, -1 for incorrect)

1. (True False) $E(X_1 + X_2) = E(X_1) + E(X_2)$ for any random variables X_1, X_2.
2. (True False) The central limit theorem can only be applied to iid random variables.

(10 pts) For the following, you must **justify** your answer to receive credit. (Showing your work counts as justification.)

3. Let X_1, X_2 be independent die (3 sided dice) roll random variables (i.e. $X_1 = X_2 = 3$ if a 3 is rolled, $X_1 = X_2 = 2$ if a 2 is rolled, and $X_1 = X_2 = 1$ if a 1 is rolled).

   (a) (3pts) Compute the PMFs for these discrete random variables. Are X_1, X_2 iid?

   (b) (3pts) Compute $E(X_1 * X_2)$.

   (c) (4pts) Does it make sense to apply the central limit theorem to approximate $\overline{X} = \frac{X_1+X_2}{2}$? Why or why not?