Circle True or False or leave blank. (1 point for correct answer, -1 for incorrect answer, 0 if left blank)

1. True   False   The Law of Large Numbers tells us that for fixed $\epsilon > 0$, the probability $P(|\bar{X} - \bar{\mu}| < \epsilon)$ goes to 1 for large n.

2. True   False   For large n, the average random variable $\bar{X}$ is nomrally distributed.

Show your work and justify your answers. Please circle or box your final answer.

3. (10 points) Suppose that a random basketball fan has a 10% chance of liking the Lakers and this probability is independent of any other fan.

   (a) (2 points) Choose a random fan. Let X be the random variable that outputs 1 if they like the Lakers and 0 otherwise. What is $E[X]$ and $SE(X)$? (Simplify your answer)

   (b) (4 points) What is the probability that in a party of 25 fans, at most $4\%(= \frac{1}{25})$ of them like the Lakers? (You do not need to simplify your answer)

   (c) (4 points) Use the CLT to approximate the probability that at most 4% of the 25 fans like the Lakers. (Hint: $z(1) = 0.3413$)