

Section 10/19

1 Question 8.1

At a restaurant, the amounts on the checks are i.i.d. with mean 40 dollars and SD 30 dollars. Let T be the total amount on 200 checks and let M be the mean amount on those 200 checks.

- a) Find $E(T)$ and $SD(T)$.
- b) If possible, sketch the approximate distribution of T and mark $E(T)$ and $SD(T)$ appropriately on your sketch. If this is not possible, explain why not.
- c) Find $E(M)$ and $SD(M)$.
- d) If possible, sketch the approximate distribution of M and mark $E(M)$ and $SD(M)$ appropriately on your sketch. If this is not possible, explain why not.

2 Question 8.3

A population consists of 1 million people. Incomes in the population have an average of 70,000 dollars and an SD of 30,000 dollars. A simple random sample of 400 people is taken from the population.

Sketch your best guesses of the shapes of the following histograms and provide your reasoning.

- a) the histogram of the 1 million incomes in the population

- b) the histogram of the 400 incomes in the sample

- c) the probability histogram of the income of a person drawn at random from the population

- d) the probability histogram of the average of a simple random sample of 400 people drawn from the population

3 Question 8.6

A coin is tossed 100 times. Let X be the number of heads.

a) What is the distribution of X ?

b) Sketch the normal curve that approximates the distribution of X . Mark the numerical values of $E(X)$ and $SD(X)$ appropriately on the sketch.

c) Use the approximation in Part b to get a rough numerical value for $P(45 \leq X \leq 55)$.

d) Find the exact numerical value of $P(45 \leq X \leq 55)$ and compare with the answer to c. The approximation is pretty rough.