Homework Set 8

DUE: APR 20, 2020 (VIA BLACKBOARD BY 11:00AM)

To be handed in:

Please write your solution to Problems 1, 2, and 3 on a single sheet of paper!

1. Find the value of $C > 0$ such that the function

$$f(x) = \begin{cases} C \sin^2 x, & \text{if } 0 \leq x \leq \pi, \\ 0, & \text{otherwise} \end{cases}$$

is a probability density function.

Hint: Remember that $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$.

2. Suppose that a continuous random variable X has probability density function given by the above $f(x)$, where $C > 0$ is the value you computed in the previous exercise. Compute $E(X)$.

Hint: Use integration by parts!

3. Compute $E(\cos(X))$.

Hint: Use integration by substitution!