CS 333202: Probability and Statistics
HW10 Part II

1. The joint density function of X and Y is given by

$$f(x,y) = \begin{cases} 2e^{-x}e^{-2y} & 0 < x < \infty, 0 < y < \infty \\ 0 & \text{otherwise} \end{cases}$$

   Compute (a) $P(X > 1, Y < 1)$, (b) $P(X < Y)$, and (c) $P(X < a)$.

2. The joint density function of X and Y is given by

$$f(x,y) = \begin{cases} e^{-(x+y)} & 0 < x < \infty, 0 < y < \infty \\ 0 & \text{otherwise} \end{cases}$$

   Find the density function of the random variable X/Y.

3. A man invites his fiancee to an elegant hotel for a Sunday brunch. They decide to meet in the lobby of the hotel between 11:30 A.M. and 12 noon. If they arrive at random times during this period, what is the probability that the first to arrive has to wait at least 12 minutes?

4. On a line segment AB of length ℓ, two points C and D are placed at random and independently. What is the probability that C is closer to D than to A?