

Math 3298 Worksheet 38: Double integral application to probability

Group members (2 to 4): _____

- (1) Suppose Xavier and Yolanda both have classes that end at noon and they agree to try to meet every day after class at a coffee shop. They arrive independently; let Xavier's arrival time be x and Yolanda's arrival time be y , measured in minutes after noon. The probability density functions for these times are:

$$f(x) = \begin{cases} e^{-x} & \text{if } x \geq 0 \\ 0 & \text{if } x < 0 \end{cases} \quad g(y) = \begin{cases} \frac{y}{50} & \text{if } 0 \leq y \leq 10 \\ 0 & \text{otherwise} \end{cases}$$

So Xavier arrives sometime after noon, usually sooner rather than later. Yolanda always arrives by 12:10, and is more likely to arrive later than sooner.

After Yolanda arrives, she will wait up to a half an hour for Xavier, but he will not wait for her. Find the probability that they meet.