Warm-up # 1
Math 392 – Spring 2020

Name: _____

You are provided the marginal distribution of X and the conditional distribution of Y given X. Your task is to find their joint distribution and the marginal distribution of Y.

$$\begin{aligned} f_X(x) &= e^{-x} \qquad 0 < x < \infty \\ f_{Y|X=x}(y|X=x) &= e^{-(y-x)} \qquad 0 < x < y < \infty \end{aligned}$$

1. Find the joint distribution of X and Y, $f_{X,Y}(x,y)$.
2. Find the marginal distribution of Y, $f_Y(y)$.
3. Why doesn't $f_{X,Y}(x,y) = f_X(x)f_Y(y)$?