

A couple notes: We've seen a pair of random variables X, Y with joint probability density $f_{X,Y}(x,y) = 35e^{-5x-7y}$ for $x > 0, y > 0$
 $= 0$ otherwise

Noticed that it can be factored: $f_{X,Y}(x,y) = (5e^{-5x})(7e^{-7y})$
for $x > 0, y > 0$

So it is the case that, for all x , all y , $f_{X,Y}(x,y) = f_X(x)f_Y(y)$

$$\text{where } f_X(x) = \begin{cases} 5e^{-5x} & x > 0 \\ 0 & \text{otherwise} \end{cases}$$

$$f_Y(y) = \begin{cases} 7e^{-7y} & y > 0 \\ 0 & \text{otherwise} \end{cases}$$

Since X and Y each have the correct

form, it follows that X is exponential with $E(X) = \frac{1}{5}$

and Y is an exponential random variable with $E(Y) = \frac{1}{7}$.

Another thing: How does the density of an exponential random variable look??

$$f_X(x) = \begin{cases} \lambda e^{-\lambda x} & x > 0 \\ 0 & \text{otherwise} \end{cases}$$



How about the CDF?

$$F_X(x) = \begin{cases} 1 - e^{-\lambda x} & x > 0 \\ 0 & \text{otherwise} \end{cases}$$

