

Problem 124

$$f(x,y) = 2e^{-(x+2y)}$$
$$= \underbrace{e^{-x}}_{f(x)} \cdot \underbrace{2e^{-2y}}_{f(y)}$$

for $x > 0; y > 0$

$f(x,y) = f(x) \cdot f(y) \Rightarrow X$ and Y independent

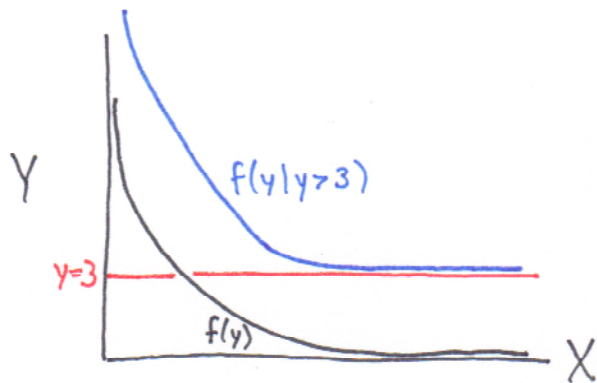
$$V(Y|X > 3 \cap Y > 3) = V(Y|Y > 3)$$

$X \sim \text{Exponential} (\theta = 1)$

$$* f(z) = \frac{1}{\theta} \cdot e^{-\frac{z}{\theta}}$$

$Y \sim \text{Exponential} (\theta = \frac{1}{2})$

Memoryless Property of Exponential Distribution



$$V(Y|Y > 3) = V(Y)$$

$$V(Y|X > 3 \cap Y > 3) = \left(\frac{1}{2}\right)^2 = \underline{\underline{.25}}$$

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