

$$6) f_{xy}(x,y) = \begin{cases} 6e^{-2x} e^{-3y}, & x > 0, y > 0 \\ 0, & \text{otherwise} \end{cases}$$

$$\begin{aligned} \bar{X} = E[X] &= \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} x f_{xy}(x,y) dx dy \\ &= \int_0^{\infty} \int_0^{\infty} 6x e^{-2x} e^{-3y} dx dy \\ &= 6 \int_0^{\infty} e^{-3y} \left[\frac{1}{4} (2x+1) e^{-2x} \right]_0^{\infty} dy \\ &= \frac{6}{4} \int_0^{\infty} e^{-3y} dy \\ &= \frac{6}{4} \left(\frac{-1}{3} e^{-3y} \Big|_0^{\infty} \right) = \frac{1}{2} \end{aligned}$$

$$\boxed{\bar{X} = \frac{1}{2}}$$

$$\bar{Y} = \int_0^{\infty} \int_0^{\infty} 6y e^{-2x} e^{-3y} dx dy = \underbrace{6 \int_0^{\infty} e^{-2x} dx}_{\frac{1}{2}} \underbrace{\int_0^{\infty} y e^{-3y} dy}_{\frac{1}{3}}$$

$$\boxed{\bar{Y} = \frac{1}{3}}$$