(1)

$$f(x,y) = \begin{cases} 2e^{-x}e^{-2y} & \text{Para } 0 < x < \infty, \ 0 < y < \infty \\ 0 & \text{Caso contrario} \end{cases}$$

$$g(x) = \int_{-\infty}^{\infty} f(x,y)\,dy = \int_{0}^{\infty} \left(2e^{-x}e^{-2y}\right) dy = e^{-x}$$

$$P(x<a) = \int_{a}^{\infty} g(x)\,dx = \int_{a}^{\infty} e^{-x} = \boxed{e^{-a}}$$

(2)

$$E[X \mid Y=0] = \int_{-\infty}^{\infty} x\, f(x \mid y)\, dx =$$

$$= \int_{0}^{1} x \cdot \frac{6x(2-x-y)}{-3y+4} \Big|_{y=0}^{-\infty} dx =$$

$$= x \cdot \frac{6x(2-x-0)}{-3 \cdot 0 + 4} dx = \boxed{\frac{5}{2}}$$

$$P(A \mid B) = \frac{P(A \cap B)}{P(B)}$$

$$\therefore f(x \mid y) = \frac{f(x,y)}{f_Y(y)} = \frac{6xy(2-x-y)}{\int_0^1 6xy(2-x-y)\,dx}$$

$$= \frac{6x(2-x-y)}{-3y+4}$$

③ média
$\mu = 80$

Variancia
$\sigma^2 = 26\ cm^2$

Amostra = 25 Vegas

$$P(\bar{x} > 83) = P\left(\frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{N}}} > \frac{83 - \mu}{\frac{\sigma}{\sqrt{N}}}\right) = P\left(z > \frac{83 - 80}{\frac{\sqrt{26}}{\sqrt{25}}}\right) = 1 - P(z \leq 2.94)$$

$$= 1 - .9984$$

$$= 0.0016$$

(4)

$$P(L \geq 280) = \frac{150}{280} = \boxed{0.53}$$