$$\Gamma(n+1) = n!$$

$$f^{x_1}(x_1) = 6c(3,1)(x_1) = \begin{cases} \dfrac{\Gamma(3+1)}{\Gamma(3)\Gamma(1)} x_1^{3-1}(1-x_1)^{1-1} & 0 < x_1 < 1 \\ 0 & \text{sonst} \end{cases}$$

$$= \begin{cases} 3x_1^2 & 0 < x_1 < 1 \\ 0 & \text{sonst} \end{cases}$$

$$f_2^1(x_1,x_2) = \begin{cases} \dfrac{1}{\frac{x_1}{2}-0} & 0 < x_2 < \frac{x_1}{2} \\ 0 & \text{sonst} \end{cases} = \begin{cases} \dfrac{2}{x_1} & 0 < x_2 < \frac{x_1}{2} \\ 0 & \text{sonst} \end{cases}$$

$$f^{(x_1,x_2)}(x_1,x_2) = f^{x_1}(x_1) f_1^2(x_1,x_2) = \begin{cases} 6x_1 & 0 < x_1 < 1, \ 0 < x_2 < \\ 0 & \text{sonst} \end{cases}$$

b) $$P(x_2 > 0,3) = \int_{-\infty}^{\infty} \int_{0,3}^{\infty} f^{(x_1,x_2)}(x_1,x_2)\, dx_2\, dx_1$$

$$= \int_0^1 \int_{0,3}^{\frac{x_1}{2}} 6x_1 \, dx_2\, dx_1$$

$$= \int_0^1 6x_1 x_2 \Big|_{x_2=0,3}^{x_2=\frac{x_1}{2}} dx_1$$

$$= \int_0^1 3x_1^2 - 6x_1 \cdot 0,3 \ dx_1$$

$$= \oint x_1^3 - 3x_1^2 \cdot 0,3 \Big]_0^1$$

$$= 1 - 3 \cdot 0,3 = 0,1$$