A28 Vert

$$f_{X,Y}(x,y) := \begin{cases} \frac{x+3y}{2} & \text{für } 0 < x < 1 \wedge 0 < y < 1 \\ 0 & \text{sonst} \end{cases}$$

Ist $f_{X,Y}$ ein Dichte(funktion)?

$$\int_0^1 \int_0^1 \frac{x}{2} + \frac{3y}{2} \, dy \, dx = \int_0^1 \frac{x}{2} \, dx + \int_0^1 \frac{3y}{2} \, dy = \frac{1}{2} \int_0^1 x + \frac{3}{2} \int_0^1 y \, dy$$

$$= \frac{1}{4} + \frac{3}{2} \cdot \frac{1}{2} = \underline{\underline{1}}$$

Randverteilungen:

$$f_X(x) = \int_0^1 \frac{x+3y}{2} \, dy = \frac{x}{2} + \frac{3}{2} \int_0^1 y \, dy = \frac{x}{2} + \frac{3}{4} = \underline{\underline{\frac{2x+3}{4}}}$$

$$f_Y(y) = \int_0^1 \frac{x+3y}{2} \, dx = \frac{3y}{2} + \frac{1}{2} \int_0^1 x = \frac{3y}{2} + \frac{1}{4} = \underline{\underline{\frac{6y+1}{4}}}$$

unabhängig(X, Y)?

$$\frac{2x+3}{4} \cdot \frac{6y+1}{4} \stackrel{?}{=} \frac{x+3y}{2}$$

$$\frac{(2x+3) \cdot (6y+1)}{16} = \frac{12xy + 2x + 18y + 3}{16} \neq \frac{x+3y}{2}$$

(aber nur knapp lol)