3.

$$f(x,y)=\begin{cases} k(2x+y) & \forall x\in[0,1] \text{ and } y\in[0,1] \\ 0 & \text{otherwise} \end{cases}$$

$$\int_{0.5}^{1}dy\int_0^1 dx\, f(x,y) = \int_{0.5}^{1}dy\int_0^1 dx\, k(2x+y) = k\int_{0.5}^{1}dy\left[2\frac{x^2}{2}+yx\right]_{x=0}^{x=1}$$

$$= k\int_{0.5}^{1}dy\,(1+y) = k\left[y+y^2/2\right]_{y=0.5}^{y=1}$$

$$= k\left\{\left(1+\frac{1}{2}\right)-\left(\frac{1}{2}+\left(\frac{1}{2}\right)^2/2\right)\right\} = k\left\{\frac{3}{2}-\left(\frac{4}{8}+\frac{1}{8}\right)\right\}$$

$$= k\left\{\frac{12}{8}-\frac{5}{8}\right\} = k\,\frac{7}{8}$$

$$\int_{-\infty}^{\infty}dy\int_{-\infty}^{+\infty}dx\, f(x,y) =$$

$$= \int_{-\infty}^{0}dy\int_{-\infty}^{+\infty}dx\, f(x,y) + \int_{0}^{1}dy\int_{-\infty}^{\infty}dx\, f(x,y) + \int_{1}^{\infty}dy\int_{-\infty}^{+\infty}dx\, f(x,y)$$

$$= \underbrace{\int_{-\infty}^{0}dy\int_{-\infty}^{+\infty}dx\, 0}_{0} + \int_{0}^{1}dy\int_{-\infty}^{+\infty}dx\, f(x,y) + \underbrace{\int_{1}^{\infty}dy\int_{-\infty}^{+\infty}dx\, 0}_{0}$$

$$= \int_{0}^{1}dy\int_{-\infty}^{0}dx\, f(x,y) + \int_{0}^{1}dy\int_{0}^{1}dx\, f(x,y) + \int_{0}^{1}dy\int_{1}^{\infty}dx\, f(x,y)$$

$$= \underbrace{\int_{0}^{1}dy\int_{-\infty}^{0}dx\, 0}_{0} + \int_{0}^{1}dy\int_{0}^{1}dx\, k(2x+y) + \underbrace{\int_{0}^{1}dy\int_{1}^{\infty}dx\, 0}_{0}$$

$$= \ldots$$