2D Probability Distributions
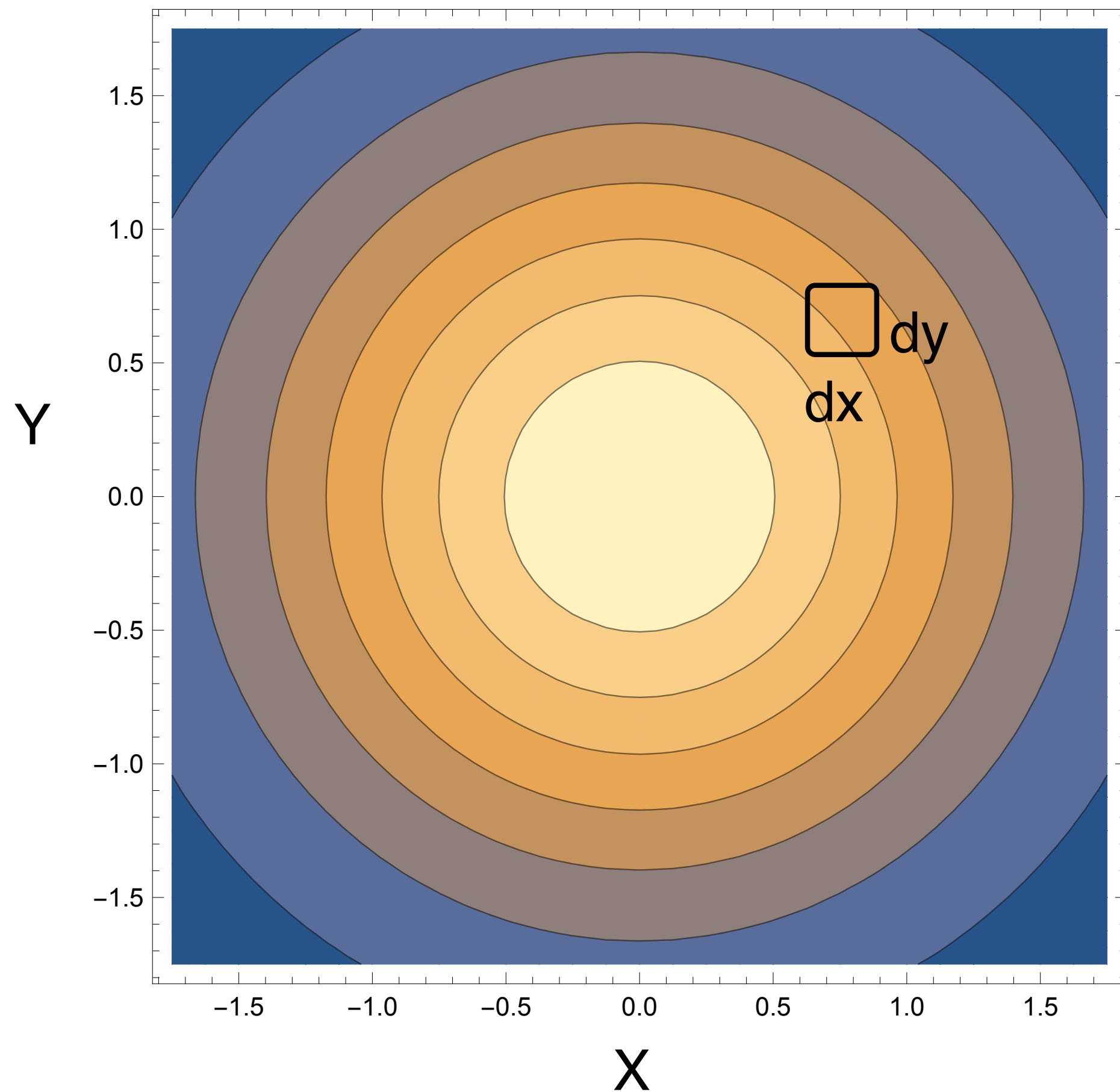
The probability to be in bin **dxdy** is:
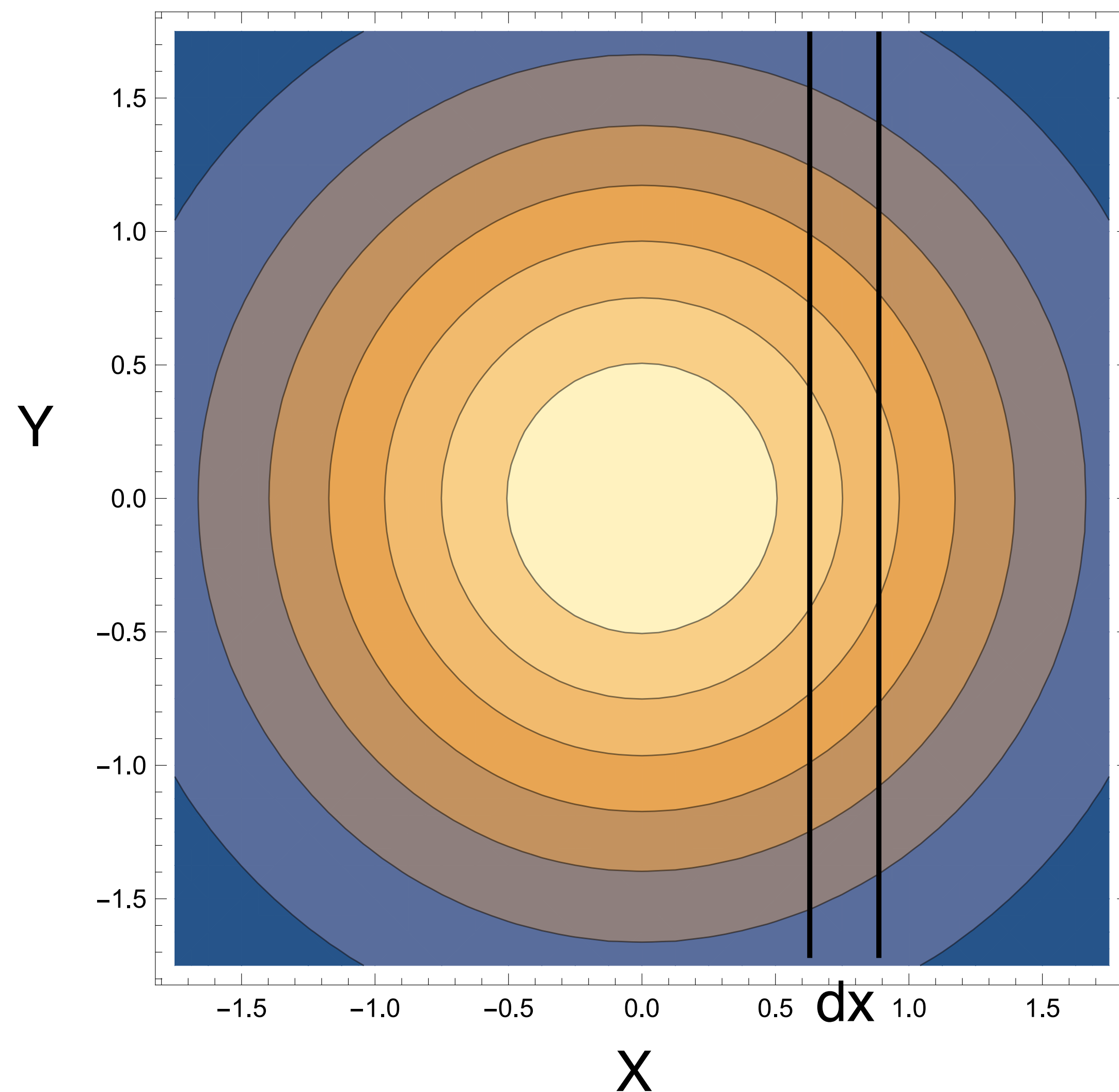
$$\mathrm{d}\mathscr{P} = P(x,y)\mathrm{d}x\mathrm{d}y$$

Example:

$$\frac{\mathrm{d}\mathscr{P}}{\mathrm{d}x\mathrm{d}y} = P(x,y) = \frac{1}{2\pi\sigma^2}e^{-(x^2+y^2)/2\sigma^2}$$

Finding $P(x)$ from $P(x, y)$ and "marginalizing" over y

I don't care what is y. Just tell me the probability of x. Any y in the bin $\mathrm{d}x$ is ok.