$$②\iint_D f(x,y)\mathrm{d}x\mathrm{d}y = \int_a^b h(x)\,\mathrm{d}x$$
$$= \int_a^b \left[\int_{y_1(x)}^{y_2(x)} f(x,y)\,\mathrm{d}y\right]\mathrm{d}x$$
$$= \int_a^b \mathrm{d}x \int_{y_1(x)}^{y_2(x)} f(x,y)\,\mathrm{d}y$$