Problem:

Change the order of integration in iterated integral:

$$\int\limits_{-1}^{1} dx \int\limits_{x^2}^{2-x^2} f(x,y)\, dy.$$

Solution:

The shaded area D is the area of integration of the iterated integral $\Rightarrow$ we see that: if y changes from 0 to 1, at the fixed y, x changes from $-\sqrt{y}$ to $\sqrt{y}$, if y changes from 1 to 2, at the fixed y, x changes from $-\sqrt{2-y}$ to $\sqrt{2-y}$, now we can change the order of integration in the iterated integral:

$$\int\limits_{-1}^{1} dx \int\limits_{x^2}^{2-x^2} f(x,y)\, dy = \int\limits_{0}^{1} dy \int\limits_{-\sqrt{y}}^{\sqrt{y}} f(x,y)\, dx + \int\limits_{1}^{2} dy \int\limits_{-\sqrt{2-y}}^{\sqrt{2-y}} f(x,y)\, dx.$$