Resolución TP7:

Ejercicio 5 - c

Graficar la región de integración R y e invertir el orden de integración.

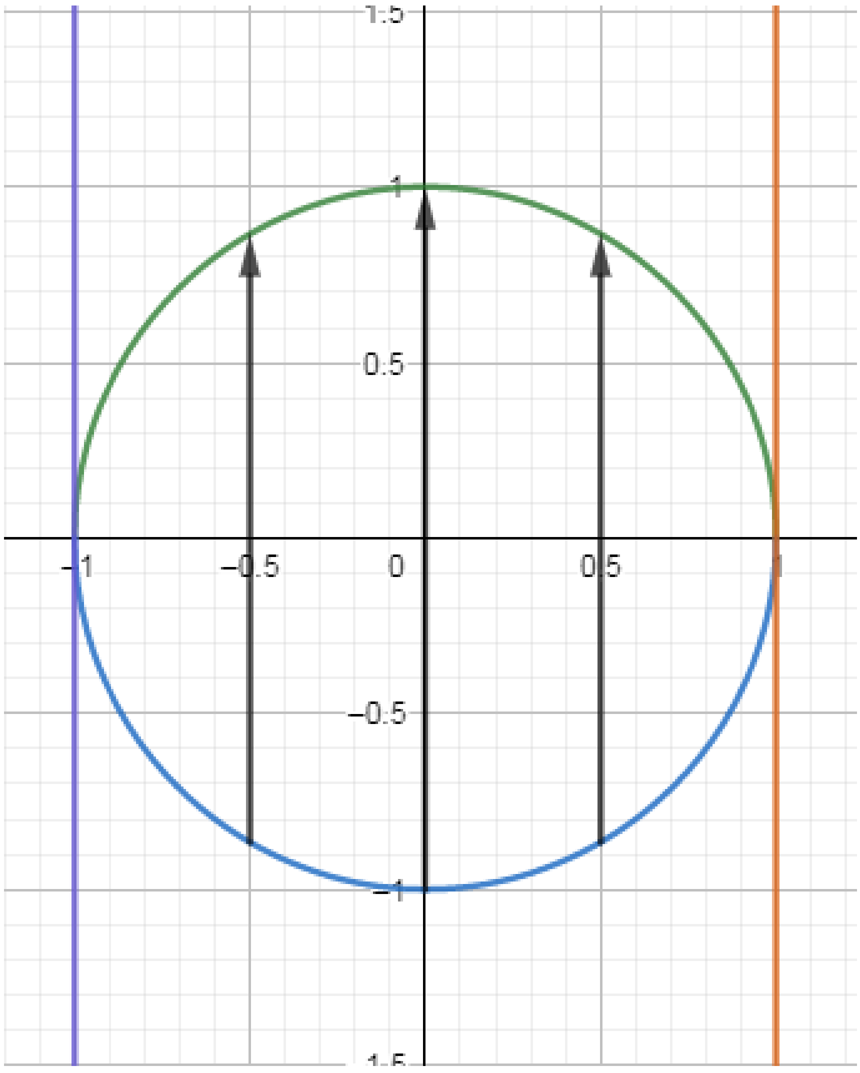
$$I = \int_{-1}^{1}\left[\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} f(x,y)dy\right]dx$$

Resolución:

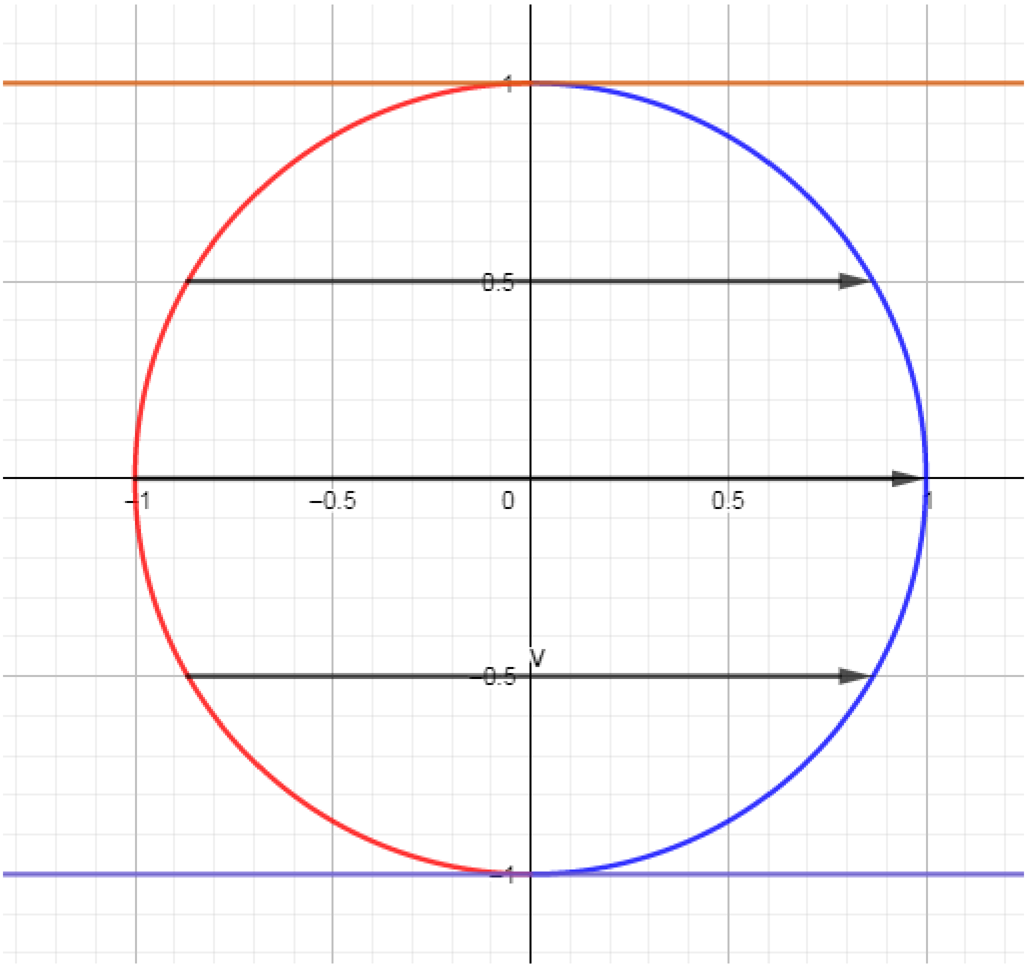
$$r(x) = \left[\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} f(x,y)dy\right] \to -\sqrt{1-x^2} \le y \le \sqrt{1-x^2}$$

$$\to x^2 + y^2 \le 1$$

$$I = \int_{-1}^{1} r(x)dx \to -1 \le x \le 1$$



$$x^2+y^2 \leq 1 \to \begin{cases} -\sqrt{1-y^2} \leq x \leq \sqrt{1-y^2} \to j(y) = \left[\int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} f(x,y)dx\right] \\ -1 \leq y \leq 1 \to \ I = \int_{-1}^{1} j(y)dy \end{cases}$$



Finalmente:

$$I = \int_{-1}^{1}\left[\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} f(x,y)dy\right]dx = \int_{-1}^{1}\left[\int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} f(x,y)dx\right]dy$$