Resolución TP7:

Ejercicio 5 - f

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

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

Resolución:

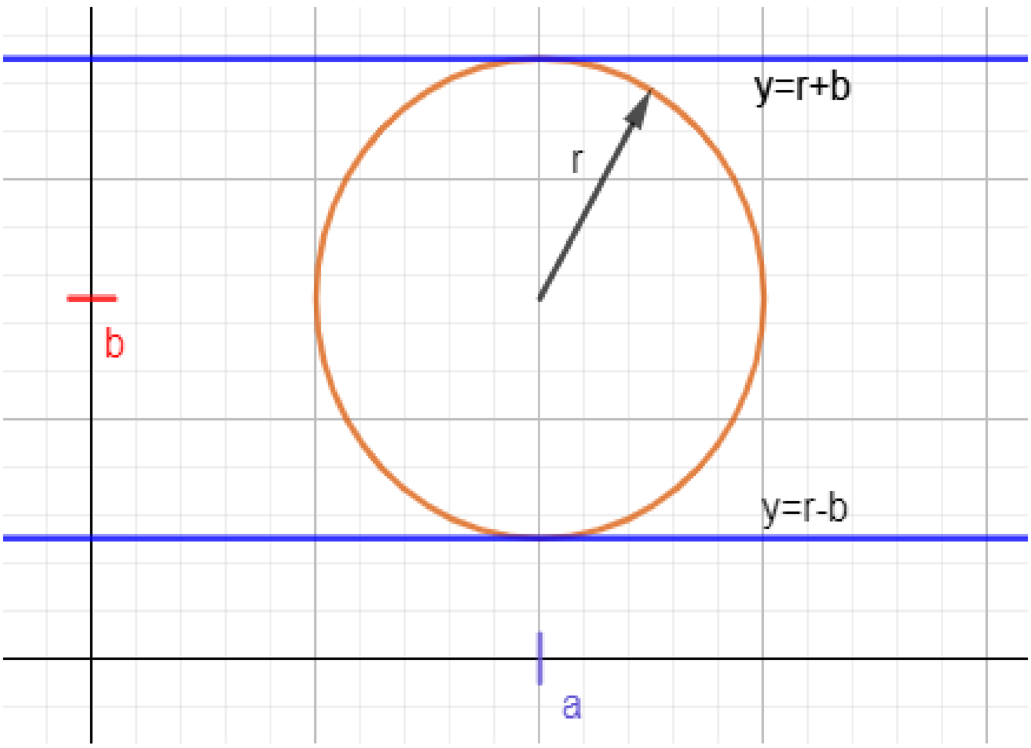
de $r(y) = \left[\int_{-\sqrt{r^2-(y-b)^2}+a}^{\sqrt{r^2-(y-b)^2}+a} f(x,y)dx \right]$ se deduce

$$-\sqrt{r^2-(y-b)^2}+a \leq x \leq \sqrt{r^2-(y-b)^2}+a$$

$$-\sqrt{r^2-(y-b)^2} \leq x-a \leq \sqrt{r^2-(y-b)^2}$$

$$(x-a)^2 \leq r^2-(y-b)^2$$

$$(x-a)^2+(y-b)^2 \leq r^2$$

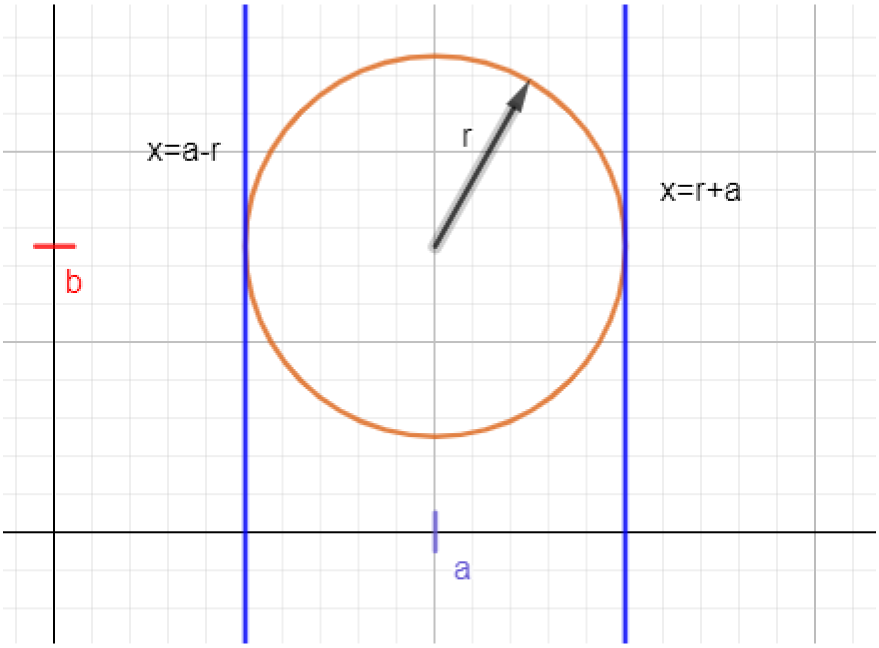


$$(x-a)^2+(y-b)^2 \le r^2$$

$$(y-b)^2 \le r^2-(x-a)^2$$

$$-\sqrt{r^2-(x-a)^2} \le y-b \le \sqrt{r^2-(x-a)^2}$$

$$-\sqrt{r^2-(x-a)^2}+b \le y \le \sqrt{r^2-(x-a)^2}+b$$



Finalmente:

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