(a) Let $a < b$, $c > 0$, f a function that is integrable on $[ca, cb]$. Use the definition of integral to prove that $\int_{ca}^{cb} f(x)\,\mathrm{d}x = c\int_a^b f(cx)\,\mathrm{d}x$. *Hint:* a partition $x_0 < x_1 < \cdots < x_n$ of $[a, b]$ induces a partition $cx_0 < cx_1 < \cdots < cx_n$ of $[ca, cb]$ and conversely.
(b) Assuming that a disk of radius 1 has area π, prove that the area enclosed by the ellipse $x^2/a^2 + y^2/b^2 = 1$ is πab.