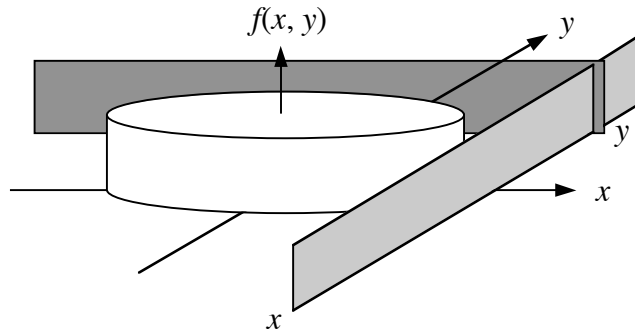


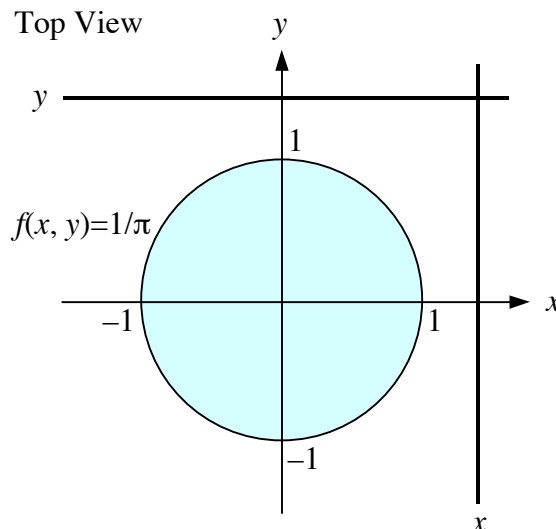
**EX:** For the following joint probability density function, plot the area on the  $x,y$ -plane where  $F(x, y) = 1$ . (In other words, plot the footprint of the area where  $F(x, y) = 1$ .)

$$f(x,y) = \begin{cases} \frac{1}{\pi} & x^2 + y^2 \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

**SOL'N:**  $f(x, y)$  is a cylinder of height  $1/\pi$ , centered on the origin:



$F(x, y)$  equals the volume of  $f(x, y)$  to the left of  $x$  and in front of, (i.e., less than),  $y$ . The illustration, above, shows two walls at  $x$  and  $y$ .  $F(x, y) = 1$  for the  $x$  and  $y$  shown, since all the volume of  $f(x, y)$  is left of  $x$  and in front of  $y$ . The region of the where  $F(x, y) = 1$  becomes apparent in a top view:



All of the volume of  $f(x, y)$  will be to the left of  $x$  for  $x > 1$  and in front of  $y$  for  $y > 1$ . Thus, the region where  $F(x, y) = 1$  is  $x > 1$  and  $y > 1$ . Note that both  $x$  and  $y$  conditions must be true.

