



Swept area is as in the figure. It is the sum of a quarter of the unit disk painted in green, half of our original triangle painted in blue, and a little triangle painted in orange. The quarter circle has area  $\pi/4$  and the blue triangle has area  $1/4$ . The little triangle is the isosceles right triangle of sidelength  $1 - \frac{1}{\sqrt{2}}$ . So it has area

$$\frac{1}{2}\left(1 - \frac{1}{\sqrt{2}}\right)^2 = \frac{3}{4} - \frac{1}{\sqrt{2}}.$$

Hence the total area is

$$\frac{\pi}{4} + \frac{1}{4} + \frac{3}{4} - \frac{1}{\sqrt{2}} = \frac{\pi}{4} + 1 - \frac{1}{\sqrt{2}}.$$