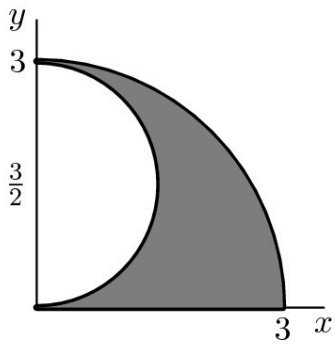
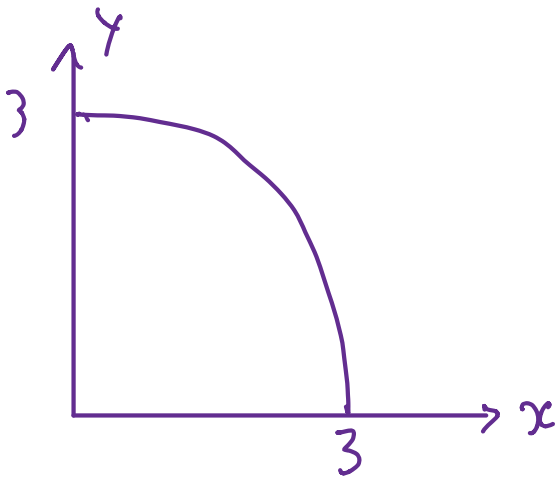
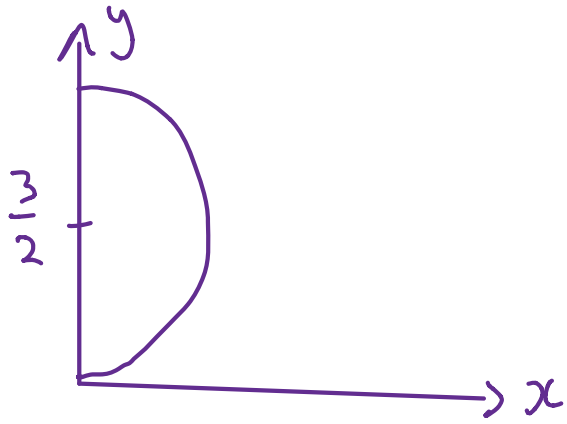
The shaded region below is called a shark's fin falcata, a figure studied by Leonardo da Vinci. It is bounded by the portion of the circle of radius 3 and center $(0,0)$ that lies in the first quadrant, the portion of the circle with radius $\frac{3}{2}$ and center $(0,\frac{3}{2})$ that lies in the first quadrant, and the line segment from $(0,0)$ to $(3,0)$. What is the area of the shark's fin falcata?





$$\text{Area} = \pi \times 3^2 \times \frac{1}{4}$$
$$= \frac{9\pi}{4}$$



$$\text{Area} = \pi \times \left(\frac{3}{2}\right)^2 \times \frac{1}{2}$$
$$= \pi \times \frac{9}{4} \times \frac{1}{2}$$
$$= \frac{9\pi}{8}$$

So shaded area $= \frac{9\pi}{4} - \frac{9\pi}{8}$

$$= \boxed{\frac{9\pi}{8} \text{ units}^2}$$