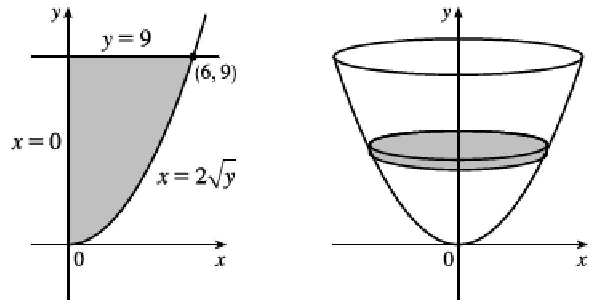
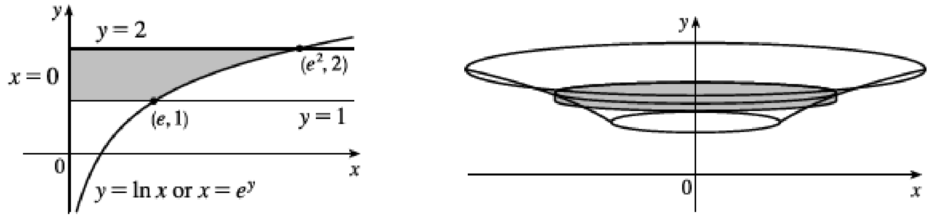
3. A cross-section is a disk with radius $2\sqrt{y}$, so its area is $A(y) = \pi\left(2\sqrt{y}\right)^2$.

$$V = \int_0^9 A(y)\,dy = \int_0^9 \pi\left(2\sqrt{y}\right)^2 dy$$
$$= 4\pi \int_0^9 y\,dy = 4\pi\left[\tfrac{1}{2}y^2\right]_0^9$$
$$= 2\pi(81) = 162\pi$$



4. A cross-section is a disk with radius e^y, so its area is $A(y) = \pi(e^y)^2$.

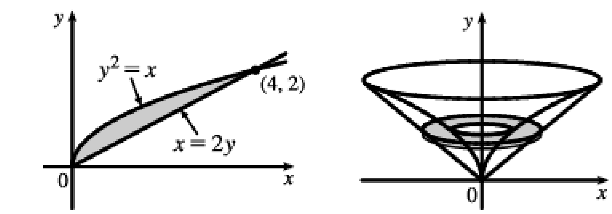
$$V = \int_1^2 \pi(e^y)^2\,dy = \pi\int_1^2 e^{2y}\,dy = \pi\left[\frac{1}{2}e^{2y}\right]_1^2 = \frac{\pi}{2}\left(e^4 - e^2\right)$$



7. A cross-section is a washer with inner radius y^2 and outer radius $2y$, so its area is

$A(y) = \pi(2y)^2 - \pi(y^2)^2 = \pi(4y^2 - y^4)$.

$$V = \int_0^2 A(y)\,dy = \pi\int_0^2 (4y^2 - y^4)\,dy$$
$$= \pi\left[\tfrac{4}{3}y^3 - \tfrac{1}{5}y^5\right]_0^2 = \pi\left(\tfrac{32}{3} - \tfrac{32}{5}\right) = \tfrac{64\pi}{15}$$



8. $y = x^{2/3} \quad \Leftrightarrow \quad x = y^{3/2}$, so a cross-section is a washer with inner radius $y^{3/2}$ and outer radius 1, and its area is $A(y) = \pi(1)^2 - \pi(y^{3/2})^2 = \pi(1 - y^3)$.

$$V = \int_0^1 A(y)\,dy = \pi\int_0^1 (1 - y^3)\,dy$$
$$= \pi\left[y - \tfrac{1}{4}y^4\right]_0^1 = \tfrac{3}{4}\pi$$