

② Correction

$$\begin{aligned}
 V &= \int_1^2 2\pi r h dx \\
 &= \int_1^2 2\pi(x - \frac{1}{2}) \log_2 x dx \\
 &= \int_1^2 2\pi x \log_2 x dx + \int_1^2 2\pi (-\frac{1}{2}) \log_2 x dx \\
 &= 4\pi - \frac{3\pi}{2\ln 2} \neq \pi \int_1^2 \log_2 x dx \\
 &= 4\pi - \frac{3\pi}{2\ln 2} \neq \pi \left[\cancel{\frac{x}{2}} \times \log_2 x - \frac{x}{\ln 2} \right]_1^2
 \end{aligned}$$

$$\begin{aligned}
 \int \log_2 x dx &= x \log_2 x - \frac{1}{\ln 2} \int 1 dx \\
 u = \log_2 x &\quad dv = dx \\
 du = \frac{1}{\ln 2 x} dx &\quad v = x \\
 &= x \log_2 x - \frac{x}{\ln 2} + C
 \end{aligned}$$

$$\begin{aligned}
 &= 4\pi - \frac{3\pi}{2\ln 2} \neq \\
 &- \pi \left[\left(2 \cdot 1 - \frac{2}{\ln 2} \right) - \left(0 - \frac{1}{\ln 2} \right) \right] \\
 &= 4\pi - \frac{3\pi}{2\ln 2} \neq \pi \left[2 - \frac{1}{\ln 2} \right] \\
 &\quad \cancel{2\pi} \cancel{- \frac{3\pi}{2\ln 2}} \\
 &= 2\pi - \frac{\pi}{2\ln 2}
 \end{aligned}$$