1. Find the exact length of the curve

$$y = \frac{1}{4}x^2 - \frac{1}{2}\ln x, \quad 1 \leqslant x \leqslant 2$$

2. The given curve is rotated about the *y*-axis. Find the area of the resulting surface. (only set up the formula)

$$y = \ln(x + 1), \ 0 \leqslant x \leqslant 1$$

3. Determine whether the given sequence converges or diverges. If it converges, find the limit.

$$\left\{\frac{\tan^{-1} n}{n}\right\}$$

1. Find the exact length of the curve

$$x = \frac{y^4}{8} + \frac{1}{4y^2}, \quad 1 \leq y \leq 2$$

2. The given curve is rotated about the $x$-axis. Find the area of the resulting surface. (only set up the formula)

$$y = \ln(x + 1), \ 0 \leq x \leq 1$$

3. Determine whether the given sequence converges or diverges. If it converges, find the limit.

$$\left\{ \frac{\cos^2 n}{2^n} \right\}$$