Radius of Convergence of a Power Series

Find the radius of convergence for each of the following series.

1.  \[ \sum_{n=1}^{\infty} \frac{1}{n} \cdot 2^n x^n \quad \text{ANS: Series centered at 0 with radius 2} \]

2.  \[ \sum_{n=1}^{\infty} \frac{1}{n} (2x - 3)^n \quad \text{ANS: Series centered at 3/2 with radius \( \frac{1}{2} \)} \]

3.  \[ \sum_{n=1}^{\infty} \frac{2^n x^n}{n} \quad \text{ANS: Series centered at 0 with radius \( \frac{1}{2} \)} \]

4.  \[ \sum_{n=1}^{\infty} \frac{2^n x^n}{n!} \quad \text{ANS: Series centered at 0 with radius \( \infty \)} \]

5.  \[ \sum_{n=1}^{\infty} \frac{(-1)^n (x - 2)^n}{n^4} \quad \text{ANS: Series centered at 2 with radius 4} \]

6.  \[ \sum_{n=1}^{\infty} \frac{(-1)^n x^n}{n + 1} \quad \text{ANS: Series centered at 0 with radius 1} \]