Practice with Power Series

Find the radius of convergence and interval of convergence of each of the following series.

1. $\displaystyle\sum_{n=1}^{\infty} \frac{x^n}{\sqrt{n}}$
2. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n-1}x^n}{n^3}$
3. $\displaystyle\sum_{n=0}^{\infty} \frac{x^n}{n!}$
4. $\displaystyle\sum_{n=1}^{\infty} \frac{(-2)^n x^n}{\sqrt[4]{n}}$
5. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n x^n}{4^n \ln n}$
6. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n (x+2)^n}{n2^n}$
7. $\displaystyle\sum_{n=1}^{\infty} n!(2x-1)^n$

Answers.

1. 1, [-1,1)
2. 1, [-1,1]
3. ∞, $(-\infty, \infty)$
4. 1/2, (-1/2,1/2]
5. 4, (-4,4]
6. 2, (-4,0]
7. 0, $\{1/2\}$