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

1) $\displaystyle\sum_{n=1}^{\infty} \frac{x^n}{\sqrt{n}}$

2) $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n x^n}{n+1}$

3) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n-1} x^n}{n^3}$

4) $\displaystyle\sum_{n=1}^{\infty} \sqrt{n} x^n$

5) $\displaystyle\sum_{n=0}^{\infty} \frac{x^n}{n!}$

6) $\displaystyle\sum_{n=1}^{\infty} n^n x^n$

7) $\displaystyle\sum_{n=1}^{\infty} (-1)^n 4^n n x^n$

8) $\displaystyle\sum_{n=1}^{\infty} \frac{x^n}{3^n n}$

9) $\displaystyle\sum_{n=1}^{\infty} \frac{(-2)^n x^n}{\sqrt[4]{n}}$

10) $\displaystyle\sum_{n=2}^{\infty} (-1)^n \frac{x^n}{4^n \ln n}$

11) $\displaystyle\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!}$

12) $\displaystyle\sum_{n=0}^{\infty} \sqrt{n}\,(x-1)^n$

13) $\displaystyle\sum_{n=1}^{\infty}(-1)^n \frac{(x+2)^n}{2^n n}$

14) $\displaystyle\sum_{n=1}^{\infty}\frac{(3x-2)^n}{3^n n}$

15) $\displaystyle\sum_{n=1}^{\infty}n!(2x-1)^n$

16) $\displaystyle\sum_{n=2}^{\infty}(-1)^n \frac{(2x+3)^n}{n\ln n}$

17) Suppose that $\sum\limits_{n=0}^{\infty} c_n x^n$ converges when $x = -4$ and diverges when $x = 6$. What can be said about the convergence or divergence of the following series?

a) $\sum\limits_{n=0}^{\infty} c_n$

b) $\sum\limits_{n=0}^{\infty} c_n 8^n$

c) $\sum\limits_{n=0}^{\infty} c_n (-3)^n$

d) $\sum\limits_{n=0}^{\infty} (-1)^n c_n 9^n$

18) If k is a positive integer, find the radius of convergence of the series: $\sum\limits_{n=0}^{\infty} \dfrac{(n!)^k}{(kn)!} x^n$