1. For each series, find the radius and interval of convergence.

(a) \[ \sum_{n=0}^{\infty} \frac{nx^n}{n+2} \]
(b) \[ \sum_{n=2}^{\infty} \frac{(2x-1)^{4n}}{\ln(n)16^n} \]
(c) \[ \sum_{n=0}^{\infty} \frac{(x+2)^n}{\sqrt{n^2 + 5}} \]

2. Find a power series with center \( c = 0 \) for each of the following functions. Also find the radius and interval of convergence of your power series.

(a) \[ f(x) = \frac{1}{1-6x} \]
(b) \[ f(x) = \frac{1}{5+2x} \]
(c) \[ f(x) = \frac{1}{16-x^4} \]

(d) \[ f(x) = \frac{1}{(1-x)^2} \]
(e) \[ f(x) = \frac{1}{(1+x^2)^2} \]

(g) \[ f(x) = \ln(1+x^6) \]
(h) \[ f(x) = \tan^{-1}(x) \]
(i) \[ f(x) = x\tan^{-1}(2x^2) \]

3. Evaluate the sum

\[ \frac{1}{2} + \frac{2}{4} + \frac{3}{8} + \frac{4}{16} + \frac{5}{32} + \cdots + \frac{n}{2^n} + \cdots \]

*Hint:* Start with a power series for \( f(x) = \frac{1}{1-x} \) and then differentiate.