Directions: Answer each question and show your work. Simplify.

1.) Find the interval of convergence.

\[ \sum_{n=1}^{\infty} \frac{(x-3)^n}{n2^n} \]  

\( (1, 5) \)

2.) Find a power series representation (centered at \( x = 0 \) ) for the function. \(5\) pts

\[ f(x) = \frac{x}{2x+1} \quad \sum_{n=0}^{\infty} (-1)^n 2^n x^{n+1} \]

3.) Find a power series representation (centered at \( x = 0 \) ) for the function. \(5\) pts

\[ f(x) = \frac{1}{(1+x)^2} \quad \sum_{n=1}^{\infty} (-1)^{n+1} nx^{n-1} \]