SECTION 6.2: PROPERTIES OF POWER SERIES

(1) Principle: Provided the x-values of the power series are in the interval of convergence, then

(2) Use partial fractions to find a power series representation of $f(x) = \dfrac{1}{(x-1)(x-3)}$

(3) Given $f(x) = \sum_{n=1}^{\infty} x^n$ and $g(x) = \sum_{n=1}^{\infty} \frac{1}{n} x^n$, find the power series representation of $f(x) \cdot g(x)$.

(4) Differentiate the given series expansion of f term-by-term to obtain a series expansion for the derivative of f.

$$f(x) = \frac{2}{2-x} = \sum_{n=0}^{\infty} \left(\frac{x}{2}\right)^n$$

(5) Use your answer to the previous problem to determine the sum of the convergent series $\displaystyle\sum_{n=1}^{\infty} \frac{n}{2^n}$.

(6) Find a power series representation of $f(x) = \frac{1}{1+x^2}$ and integrate the series expansion term-by-term to obtain a series expansion for $\arctan(x)$.