

Find a power series representation for the function and Determine the interval of convergence.

Example 1. $f(x) = \frac{1}{1+x}$

Example 2. $f(x) = \frac{x}{1+x}$

Example 3. $f(x) = \frac{1}{1+x^2}$

Example 4. $f(x) = \frac{1}{2-x}$

Example 5. $f(x) = \frac{1}{x}$

Example 6. $f(x) = \frac{x}{1+9x^2}$

Example 7. $f(x) = \frac{1}{(2-x)^2}$

Example 7'. $f(x) = \frac{x}{(2-x)^2}$

Example 8. $f(x) = \ln(1+x)$

Example 9. $f(x) = x \ln(1+x^2)$

Example 10. $f(x) = \ln(3-x)$

Example 11*. $f(x) = x \ln(3-x^2)$

Example 12*. $f(x) = \tan^{-1} x$