

Problem statement a) Use the formula $\frac{a}{1-r} = a + ar + ar^2 + ar^3 + \dots$ valid for $|r| < 1$ to express each of the following functions as a power series $a_0 + a_1x + a_2x^2 + \dots + a_nx^n + \dots$. Give a formula for the coefficient a_n in each case.

$$f(x) = \frac{x}{1-x}; \quad g(x) = \frac{2}{3x^4 + 16},$$

b) Determine the interval of x values in which each series in part a) converges (be sure to consider the endpoints).

c) Use your answer to a) to express $\int_0^1 \frac{2}{3x^4 + 16} dx$ as the sum of an infinite series.