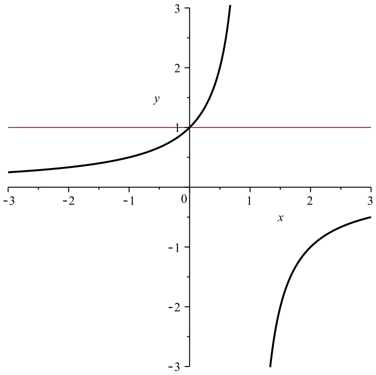
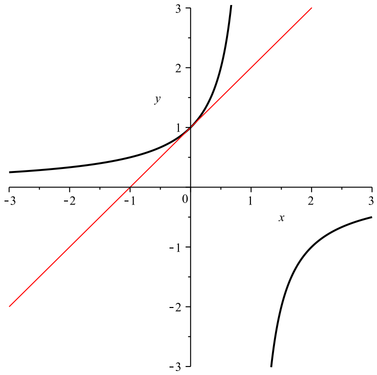
Convergence of the geometric series $\sum x^n$ ***to the function*** $f(x) = \frac{1}{1-x}$

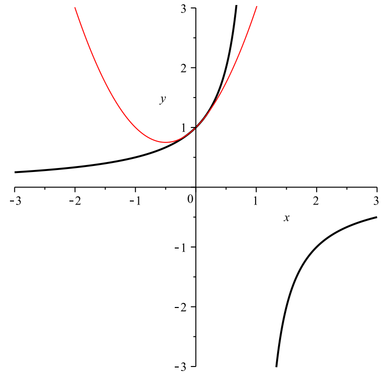
$$\frac{1}{1-x} \approx 1 = s_0$$



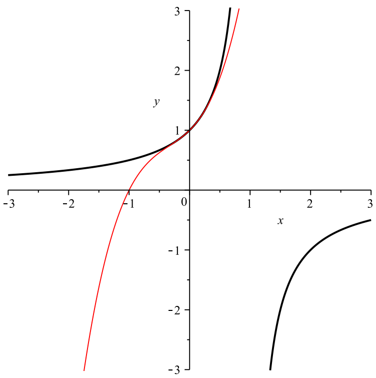
$$\frac{1}{1-x} \approx 1 + x = s_1$$



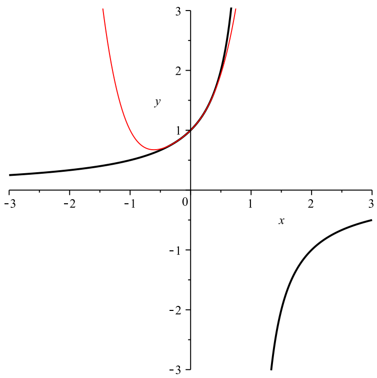
$$\frac{1}{1-x} \approx 1 + x + x^2 = s_2$$



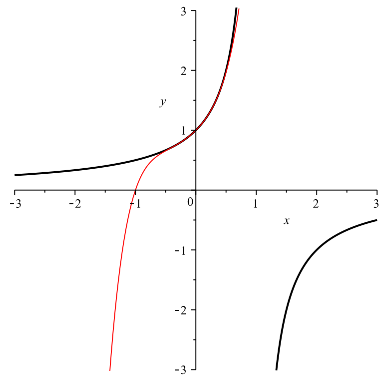
$$\frac{1}{1-x} \approx 1 + x + x^2 + x^3 = s_3$$



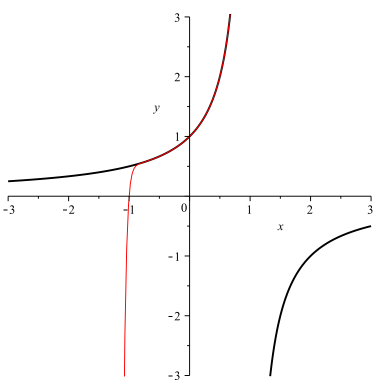
$$\frac{1}{1-x} \approx 1 + x + x^2 + x^3 + x^4 = s_4$$



$$\frac{1}{1-x} \approx 1 + x + x^2 + x^3 + x^4 + x^5 = s_5$$



$$\frac{1}{1-x} \approx 1 + x + x^2 + x^3 + x^4 + x^5 + \ldots + x^{25} = s_{25}$$



Since the geometric series $\sum_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \ldots$ converges to $\frac{1}{1-x}$ for $|x| < 1$,

we expect the graphs of $f = \frac{1}{1-x}$ and the n^{th} partial sum $s_n = 1 + 1 + x + x^2 + x^3 + \ldots x^n$

to match well on the same interval $|x| < 1$.