#66. Find the maclaurin series for $f(x)=\frac{x^2}{(1+9x)^3}$.

We start with $\frac{1}{1+9x}=\sum_{n=0}^{\infty}(-9x)^n=\sum_{n=0}^{\infty}(-1)^n 9^n x^n$

then, $\frac{1}{(1+9x)^2}=-\frac{1}{9}\left(\frac{1}{1+9x}\right)'=-\frac{1}{9}\left(\sum_{n=0}^{\infty}(-1)^n 9^n x^n\right)=-\frac{1}{9}\sum_{n=1}^{\infty}(-1)^n 9^n n x^{n-1}$

$$=\sum_{n=1}^{\infty}(-1)^{n+1}9^{n-1}n\,x^{n-1}$$

$$\frac{1}{(1+9x)^3}=-\frac{1}{18}\left(\frac{1}{(1+9x)^2}\right)'=-\frac{1}{18}\left(\sum_{n=1}^{\infty}(-1)^{n+1}9^{n-1}n\,x^{n-1}\right)'$$

$$=-\frac{1}{18}\sum_{n=2}^{\infty}(-1)^{n+1}9^{n-1}n(n-1)\,x^{n-2}$$

$$=\frac{1}{2}\sum_{n=2}^{\infty}(-1)^n 9^{n-2}n(n-1)x^{n-2}$$

$$\frac{x^2}{(1+9x)^3}=x^2\cdot\frac{1}{2}\sum_{n=2}^{\infty}(-1)^n 9^{n-2}n(n-1)x^{n-2}$$

$$=\boxed{\frac{1}{2}\sum_{n=0}^{\infty}(-1)^n 9^{n-2}\,n(n-1)\,x^n}$$