

## Popular Maclaurin Series and their intervals of convergence!

Write the Maclaurin series for each of the following functions. Show four terms and give the  $\Sigma$ -notation and state the interval of convergence. Try to do these without looking them up.

Interval

$e^x =$

$\sin x =$

$\cos x =$

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

(1) Use substitution to find series for each of the following. Show four terms.

(a)  $\sin(3x) =$

(b)  $e^{4x} =$

(c)  $\cos(x/2) =$

(d)  $\frac{1}{e^{2x}} =$

(e)  $e^{x^2} =$

Please note that the interval of convergence for all of these is still  $\mathbb{R}$ .

- (2) Write the series for  $\frac{1}{1-2x}$ , showing four terms. Find the interval of convergence, again using substitution.

Write the series for  $\frac{1}{1+3x}$ . Find the interval of convergence.

Write the series for  $\frac{3}{3-2x}$  by writing this as  $\frac{1}{1-2x/3}$ . Find the interval of convergence.

- (3) Logarithms. (You may need to look this up or derive this.) Show four terms.

Series

Interval of convergence

$$\ln(1+x) =$$

$$\ln(1+5x) =$$

$$\ln(1-x/3) =$$