Math 250 Series Maclaurin Name____________________

You should know the following Maclaurin series:

$$e^y = \sum_0^\infty \frac{y^n}{n!} \qquad \sin y = \sum_0^\infty \frac{(-1)^n y^{2n+1}}{(2n+1)!}$$

$$\frac{1}{1-y} = \sum_0^\infty y^n \qquad \cos y = \sum_0^\infty \frac{(-1)^n y^{2n}}{(2n)!}$$

E.g. Find the Maclaurin series for

1) $\frac{1}{1+x^2} = \frac{1}{1-(-x^2)}$ and here $y = -x^2$ $\frac{1}{1+x^2}\sum_0^\infty (-x^2)^n = \sum_0^\infty (-1)^n x^{2n}$

2) $\ln(1+x) = \int \frac{dx}{1+x} = \int \sum_0^\infty (-x)^n dx = \sum_0^\infty (-1)^n \int x^n dx$

Find the Maclaurin series for

e^{-x^2} $\tan^{-1} x$ $\int_0^{1/2} e^{-x^2} dx$

$\frac{\sin x^2}{x}$ $\frac{e^x - 1 - x}{x}$ $\frac{\sin x - x + \frac{x^3}{6}}{x}$

$\frac{\cos x - 1}{x}$ $\int_0^1 \cos x^2 dx$