DATE: ___________

Power Series

Recall the Power Series, centered at x = a:

$$f(x) = c_0 + c_1(x-a) + c_2(x-a)^2 + c_3(x-a)^3 + \cdots + c_n(x-a)^n + \cdots$$

Power Series Theorems

If

$$f(x) = \sum_{n=0}^{\infty} c_n(x-a)^n$$

$$= c_0 + c_1(x-a) + c_2(x-a)^2 + c_3(x-a)^3 + \cdots + c_n(x-a)^n + \cdots$$

is diff'able and converges on $(a-R, a+R)$,

then

① $f'(x) =$

AND

② $\int f(x)\, dx =$

also,

$$\int_a^x f(t)\, dt =$$

- If the series for f converges for all x, then so does the series for f' and the series for $\int f(x)\, dx$.

Express each function as a power series.

Example 1:

$\frac{1}{(1-x)^2}$

Example 2:

$\ln(1-x)$

Example 3:

$\tan^{-1} x$