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Taylor Series - Tutoring Sheet #6

- 1. Obtain the expansion of the following functions as indicated :
 - a. $f(x) = e^{\frac{x}{2}}$ according to powers of x
 - b. f(x) = Inx according to powers of x 2
 - c. $f(x) = \cos^2 x$ according to powers of x
 - d. $f(x) = \frac{1}{1+x^2}$ according to powers of x

deduce the expansion of **arctanx** by evaluating $\int_{0}^{x} \frac{dx}{1+x^{2}}$

- **2.** Use the expansions of e^{ix} , cosx and sinx to show that: $e^{ix} = \cos x + i \sin x$
- **3.** Evaluate using expansion, the following integral : $\int_{0}^{1} \frac{\sin x}{x} dx$
- 4. Using the expansions of e^{x} and sinx , cosx ,find the expansions of the following:

a.
$$e^{1-sinx}$$
 b. $e^{x} cosx$