

Department of Mathematics, Bennett University
Engineering Calculus (EMAT101L)
Tutorial Sheet 6

1. Find the first three non-zero terms of the Taylor's expansion about the point x_0 of the following functions:

(a) $\sin x$, $x_0 = \frac{\pi}{2}$, (b) $\tan^{-1} x$, $x_0 = 0$.

2. Find the domain of validity when $\sin x$ is approximated by $x - (x^3/6)$ with an error of magnitude no greater than 5×10^{-4} .

3. Estimate the error in the approximation of $\sinh x = x + \frac{x^3}{3!}$, when $|x| < 0.5$.

4. Find the error while approximating $\sqrt{1+x}$ with $1 + (x/2)$ in $|x| < 0.01$.

5. Find the radius of convergence and domain of convergence of the following:

(a) $\sum_{n=1}^{\infty} \frac{(-1)^n (x-2)^n}{2^n}$, (b) $\sum_{n=0}^{\infty} \frac{(x+2)^{3n}}{25^n}$, (c) $\sum_{n=0}^{\infty} (n+1+2^n)x^n$.

6. Write the Taylor's series around 0 and find the radius of convergence of the following:

(a) $\frac{1}{1+x}$, (b) $\sinh x$, (c) $\cos^{-1} x$.