1. If the subsequences $ \{x\_{3n}\}$ ,$ \{x\_{3n-1}\} ,\{x\_{3n+1}\}$ of a sequence of $\{x\_{n}\}$ converges to same limit $l$ then the sequence is convergence and $\lim\_{n\to \infty }x\_{n}=l$.
2. Let $f\left(x\right)=4x^{3}-3x^{2}+8x-4$.Show that f(x) has at least one root between 0 and 1.
3. Using $ϵ-δ $definition of limit show that $\lim\_{x\to 0}x^{2}\sin(\left(\frac{1}{x}\right))=0$ .
4. Find the derivative of x|x|.
5. If $y=cosh⁡(sin^{-1}x)$ then show that $\left(1-x^{2}\right)y\_{n+2}-\left(2n+1\right)xy\_{n+1}=(n^{2}+1)y\_{n}$ .
6. If $u=sin^{-1}\sqrt{\frac{x^{\frac{1}{3}}+y^{\frac{1}{3}}}{x^{\frac{1}{2}}+y^{\frac{1}{2}}}}$ ,then show that $x\frac{∂u}{∂x}+y\frac{∂u}{∂y}+\frac{tan u}{12}=0$ .
7. If lx+my=1 be a normal to the parabola $y^{2}=4ax$ then show that $al^{3}+2alm^{2}=m^{2}$.
8. Obtain Maclaurin series expansion for ln(1+x) and using it to find the series representation of $\frac{1}{1+x}$ for $-1<x\leq 1$.