Answer on Question #49120 – Math – Calculus

Find the Maclaurin expansion for the function f(x)=sin2x.

Solution.

The Maclaurin expansion for the function $g(t)=\sin t$ is $\sum_{k=1}^{\infty}\frac{(-1)^{k-1}}{(2k-1)!}\cdot t^{2k-1}$.

The series is convergent for $t\in R$.

Let substitute $t=2x$. Then, the Maclaurin expansion for the function $f(x)=\sin 2x$ is

$$\sum_{k=1}^{\infty}\frac{(-1)^{k-1}}{(2k-1)!}\cdot(2x)^{2k-1}=\sum_{k=1}^{\infty}\frac{(-1)^{k-1}\cdot 2^{2k-1}}{(2k-1)!}\cdot x^{2k-1}.$$

This series is convergent for $x\in R$ too.

Answer: $\sum_{k=1}^{\infty}\frac{(-1)^{k-1}\cdot 2^{2k-1}}{(2k-1)!}\cdot x^{2k-1}$, convergent for $x\in R$.