Answer on Question #52191 – Math – Calculus

Leibnitz formula is given by

Solution

Leibnitz formula for the n-th derivative of a product:

$$(fg)^{(n)} = \sum_{k=0}^{n} \binom{n}{k} f^{(n-k)}\, g^{(k)},\ where\ \ \binom{n}{k} = \frac{n!}{(n-k)!k!}$$

If $n = 1$ then $(fg)' = f'g + fg'$.

Leibnitz Formula for π:

$$\frac{\pi}{4} = \sum_{n=1}^{\infty} \frac{(-1)^n}{2n+1}$$

Leibnitz rule for differentiation under the integral sign:

$$\frac{d}{dx}\left(\int_{y_0}^{y_1} f(x,y)dy\right) = \int_{y_0}^{y_1} \frac{\partial f(x,y)}{\partial x} dy,$$

where y_0 and y_1 are fixed real numbers

$$\frac{d}{dx}\left(\int_{u}^{v} f(x,y)dy\right) = \int_{u}^{v} \frac{\partial f(x,y)}{\partial x} dy + f(x,v)\frac{dv}{dx} - f(x,u)\frac{du}{dx}\ ,$$

where *u* and *v* are functions of *x*.