Question #22405 Prove that $d/du(AB) = A(dB/du)+(dA/du)B$ where A,B are differentiated functions of u.

Solution. Really, $\frac{AB(u+\Delta u)-AB(u)}{\Delta u} = \frac{A(u+\Delta u)(B(u+\Delta u)-B(u))+B(u)(A(u+\Delta u)-A}{\Delta u}$

$A(u+\Delta u)\frac{B(u+\Delta u)-B(u)}{\Delta u} + B(u)\frac{A(u+\Delta u)-A(u)}{\Delta u}$. Passing to the limit as $\Delta u \to 0$ and using the fact that A is continuous, due to it is differentiated one gets the desired equality.