Sample student worksheet on discovering the product rule.

In this worksheet you will use an interactive web page to help you deduce a formula for the derivative of a product of functions, $f(x)g(x)$. Using a PC connected to the Internet, point your web browser (Netscape or Internet Explorer) to

`http://www.jcu.edu/cspitzna/calculus/`

From there, click on the link to *The Product Rule*. Use this web page perform the experiments below, and to help you answer the corresponding questions. ***Be sure to read the questions and directions carefully.***

1. On the web page you will see a function $f(x)$ and its derivative, $\frac{\partial}{\partial x} f(x)$. You may not be familiar with these functions, but that will not impair your ability to continue with these questions!

   What is the function $f(x)$ presented on the web page?

   What is its derivative?

   There is also a function $g(x)$ and its derivative, $\frac{\partial}{\partial x} g(x)$.

   What is the function $g(x)$?

   What is its derivative?

2. The web page also shows the product function, $f(x)g(x)$. What is this function?

   What is the derivative of the product, $\frac{\partial}{\partial x} f(x)g(x)$?

3. Look carefully at the formula for $\frac{\partial}{\partial x} f(x)g(x)$ and the expressions for the derivatives of f and g. Try to recognize the original functions and their derivatives as parts of this formula. Write an expression for $\frac{\partial}{\partial x} f(x)g(x)$ that uses only the symbols $f(x)$, $g(x)$, $\frac{\partial}{\partial x} f(x)$ and $\frac{\partial}{\partial x} g(x)$.