More Differentiation Practice

1. Take the derivative of the following functions:

   (a) $f(x) = 4^x + x^2 + 13$.

   (b) $f(x) = x^2 4^x$

   (c) $f(x) = x^3 e^x$

   (d) $f(x) = e^x x^\pi - 2\pi^x$

   (e) $f(x) = (2x^{-3} - e^x)\sqrt{x}$.

   (f) $f(x) = \sqrt{x}(5 - e^x)$

2. Calculate the derivative of $f(x) = x^7$ two different ways:

   (a) Use the power rule

   (b) Write $f(x) = g(x)h(x)$, with $h(x) = x^3$ and $g(x) = x^4$. Use the product rule.

3. Do you get the same result using your two different methods? Do you find the internal consistency of mathematics to be comforting or constraining?