Chemistry 230 -- Quiz 1

September 5, 2001 — Tellinghuisen

Pledge and signature:

Note: If you want your paper returned folded (*i.e.*, score concealed), please print your name on the back.

1. (12) Obtain dy/dx for: (a) $y = e^{\ln(2x)}$; (b) $y = \ln[(3x^2 + 4)^3]$ (c) $y = 5^{2x^3}$.

2. (8) The ideal gas law reads $PV = nRT$, where P is the pressure, V the volume, n the number of moles, R the gas constant, and T the absolute temperature.

   (a) Express P as a function of V, n, and T.

   (b) What are the <u>independent</u> and <u>dependent</u> variables here?

   (c) Give a general (formal) definition of dP; then evaluate all the partial derivatives to make this expression specific.

3. (6) In problem 11, you had to use the chain rule to obtain the partials $(\partial f/\partial x)_t$ and $(\partial f/\partial t)_x$, when f was defined as $f(x+ct)$. Suppose now that $f = f(u)$, with $u = x^2 + 3t$. Obtain $(\partial f/\partial x)_t$, $(\partial^2 f/\partial x^2)_t$, and $(\partial f/\partial t)_x$. [Express these in terms of $f'(u)$ and $f''(u)$.]