HW 1. Calc Review

1. Provide work for the example problems given on pg 4 of the "math notes" pdf. The answers are already given.

2. Show a mathematical proof of Avogadro's law for an ideal gas. What is the slope of the plot of V vs n?

3. $\frac{d}{dx}\left(Be^{\frac{-x^2}{2}}\right)$ 4. $\frac{d^2}{dx^2}(x^3 \cos nx)$ 5. $\frac{d}{dx}\left(\frac{(x^2-1)^4}{x}\right)$

6. For the function F(w,x,y,z) = $3xy^2 + \frac{w^3 z^3}{32y} - \frac{2xy^2 z^5}{w}$

a. Find $\left[\left(\frac{\partial F}{\partial z}\right)_{w,x,y}\right]$

b. Take the derivative of the answer from part a.) with respect to y at constant w,x,z

7. For 2 moles of an ideal gas, determine the second derivative of V with respect to P at constant T

8. Given that work is the integral of –PdV, calculate the work done by 1 mole of an ideal gas expanding to _twice its original volume_ at 100°C in units of kJ.   You can assume that the constant obtained from the integration is negligible (C = 0)