Pledge and signature:

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1. (5)   A quantity x is uncertain by 2.0% and y is uncertain by 3.0%. Give the % uncertainties for z in each of the following cases:

   a. $z = 5/y$

   d. $z = 5\,x^2/y$

   b. $z = 11x^3$

   c. $z = 1/\sqrt{7y}$

   e. $z = \sqrt{4xy}$

2. (4)   An unweighted fit of 22 thermistor calibration correction values yields the results shown here. Calculate s_y^2 and s_y. (Give at least four significant figures.)

y = a + b*(x-25) + c*(x-25)^2		
	Value	Error
a	0.050861789	0.001247068
b	0.0036498518	0.0002037433
c	-0.00074572609	3.839555e-05
Chisq	0.00049905721	NA
R	0.96765516	NA

3. (3)   In the triple-point experiment, we will estimate the heat of fusion of ice from the sublimation and vaporization heats using $H_{fus} = H_{sub} - H_{vap}$. If $H_{vap} = 40.738 \pm 0.107$ kJ/mol and $H_{sub} = 47.597 \pm 0.072$ kJ/mol, calculate H_{fus} and its uncertainty, and use the 10% rule to properly express these results.

4. (4)   We learned last week that Arrhenius activation energies can be estimated from two values of the rate constant, at T_1 and T_2, using $\ln (k_2/k_1) = E_a/R\,(T_1^{-1} - T_2^{-1})$.

   a. If k_2 has 2.0 % uncertainty and k_1 has 1.5 % uncertainty, what is the % uncertainty in their ratio?

   b. Assuming T_1 and T_2 have negligible uncertainty, use these results to give an expression for the uncertainty in E_a. (Hint: To help keep things straight, let $y = k_2/k_1$ and $z = \ln y$; then express E_a in terms of z.)