

Chemistry 236 -- Quiz 1  
September 16, 2009 — Statistics and KaleidaGraph Basics

**Pledge and signature:**

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

1. (2) Consider the number 41. If this represents a rounded experimental result, what are its absolute and percent uncertainties?
2. (3) A pressure is measured to be 654.15 Torr and is estimated to be uncertain by 0.35 %. Using the 10% rule for uncertainties, state this pressure and its uncertainty.
3. (5) Marge Inovera measures a quantity 43 times and obtains an average and a sum of squared residuals. If the latter is 789.155,
  - a. Give Marge's estimated variance, standard deviation, and standard deviation in the mean. (Give precision commensurate with the provided information.)
  - b. Use the 10% rule to restate the latter two values.
4. (2) State the following quantities unambiguously to 5 significant figures:
  - a. 12000071
  - b. 66.122500
5. (6) An unweighted fit of 37 thermistor calibration correction values yields the results shown here.
  - a. Calculate  $s_y^2$  and  $s_y$ . (Give at least four significant figures.)
  - b. Suppose this were a weighted fit, but with the weights known in only a relative sense. Calculate the corrected values for the errors in  $a$  and  $b$ . (Again, 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

6. (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.  $z = 5 x/y^2$

b.  $z = 11x^4$

c.  $z = 1/\sqrt{3}y$

e.  $z = x\sqrt{4y}$

7. (4) A quantity  $x$  is uncertain by 2 and  $y$  is uncertain by 3. Give the uncertainties for  $z$  in each of the following cases:

a.  $z = 5 + y$

c.  $z = 11 + 4x - 9y$

b.  $z = -9x$

d.  $z = 15 x + y^2$  [Take  $y = 7$ .]