AP Statistics / Mr. Hansen   Name: _____
2/26/2002 [rev. 3/10/2003, 3/3/2004, 4/8/2005, 4/15/2006, 3/18/2007,
3/8/2008, 2/14/2010, 2/5/2015, 3/2/2015]

PHA(S)TPC Procedures for Hypothesis Testing
"Very Hairy Apes Sometimes Trash People's Cars": Mr. Hansen and the Class of 2001
"Varsity Hockey Always Smashes The Puck Carrier": Marques M., Class of 2003
"Vociferous Hotheads Always Start Terrible Political Campaigns": Liam B., Class of 2003
"Varsity Hockey Always Smells Terrible Post-Contest": Alex K., Class of 2003
"Please Help All Students To Pass Calculus": Class of 2004
(Memorize one of these, or make up your own phrase!)

Note 1: Do not write the letters PHASTPC, since they will mean nothing to the AP graders. Instead, write what is shown in the second column.
Note 2: For confidence intervals, you may leave out most of the steps. All you have to show are the definitions of your parameters, the
assumptions (stated and checked), the critical value ($z*$ or $t*$), the m.o.e. calculation (crit. value times s.e.),
and a conclusion. These may be summarized as PA*MC.

ID	Heading [or optional heading] to write on AP exam	Example/how to begin	Comments	
P	[Params.]	Let ...	Good idea to use phrases such as "true mean" or "true proportion" to indicate that you're concerned with parameters. If there are two, ditto marks are fine on second line. Be sure to use the context of the problem. For example, say "true mean boiling point" instead of simply "true mean."	
H	H_0: _____ H_a: _____	[start filling in as shown at left]	Hypotheses must be statements about *parameters,* never about statistics. Choose a 1-sided or 2-sided alternative depending on what it is that you're trying to gather evidence to conclude.	
A	Assumptions for _____ test	SRS [usu. a safe bet!] + other assumptions as shown on STAT TESTS handout.	**State the name of the test you are using** (1-sample t, 2-prop. z, or whatever). Then state assumptions in abbreviated style and indicate how you have checked them. For example, if sample size is 47 and the assumption is pop. $\geq 10n$, write this: pop. $\geq 10n = 10(47) = 470$	

(S)	Sampling distrib. of _____ , assuming H_0 is true	[make sketch centered on hypothesized value for t or z test; make sketch showing a vague skew right distribution starting at 0 for χ^2 test]	Optional step, but always worth doing, even after you learn how to do all the other steps by heart.	
T	Test statistic	$t = ...$ $z = ...$ $\chi^2 = ...$	In this class, we study only 3 types of test statistics: t, z, and χ^2. Choose the one that is appropriate for your problem. If you use a z test statistic, be sure to cross your z!	
P	[P value]	$P =$ _____ [shaded area]	No need to say "by calc." or "by table" if you made a sketch.	
C	Conclusion in context	Since $P < \alpha = 0.05$, there is good evidence ($t = 2.108$, df $= 26$, $P = 0.0448$) that the true mean boiling point is not 79.4 degrees.	Rules of thumb (imprecise): below .01 is "very strong," .01 to .05 is "moderately strong," .05 to .10 is "some evidence" or "weak evidence," above .10 is "no evidence." Everyone has his own notion of where these fuzzy cutoff values lie, so don't be too concerned about distinguishing between gradations of strength. If your α level (i.e., significance cutoff level) is set in advance, your job is easy: $P < \alpha$ means there is evidence to reject H_0, while $P > \alpha$ means there is no evidence to reject H_0. **Note!** 1. We never prove H_0. We merely determine whether to reject it or to fail to reject it. 2. Always write your conclusion in the context of the problem. AP graders expect to see this for full credit.	