CHAPTER 8 - HYPOTHESIS TESTING (This sheet can be used during Quizzes and Exams)

		Column (a)	Column (b)	H_1 (Alternative hypothesis)	H_0 (Null hypothesis)
The claim or hypothesis in words	Population parameter (p or μ)	Hypothesis in symbols (will include p or μ)	Symbolic form that must be true when column (a) is false	Which column (a) or (b) does **not** include equality? Make that H_1. *This H_1 column **must** use the < or > or ≠ symbol*	The other column [(a) or (b)]. Make that H_0. *This H_0 column **must** use the = symbol (replace any ≤ or ≥ with =).*

Glenn's Helpful Hypothesis Table (**GHHT**) to Identify H_0 and H_1 (same as **Steps 1, 2, 3** on pages 398 and 399, but more procedural)

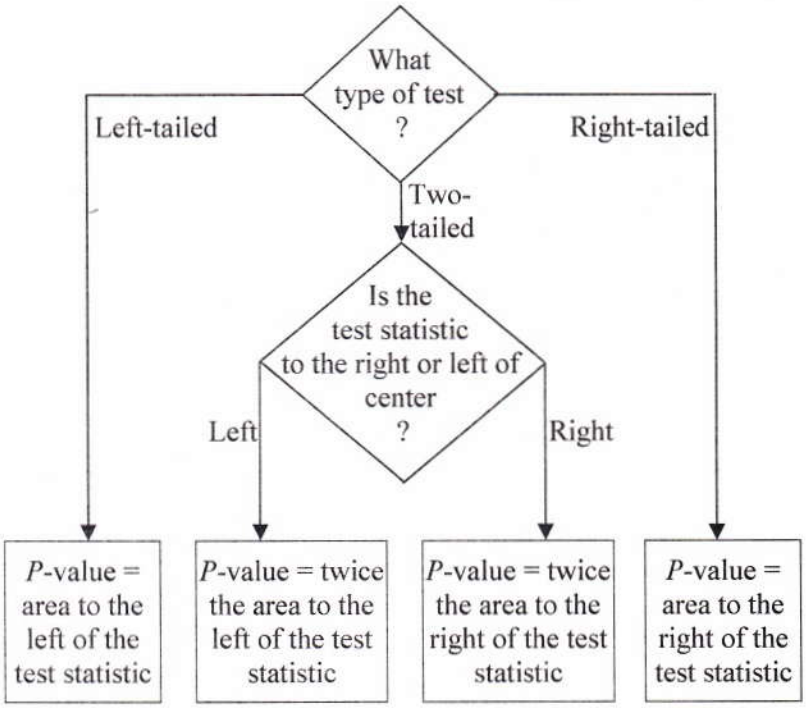
P-Value Method (see Figure 8-1, page 399)

Start

1. Identify the specific claim or hypothesis to be tested, & put in symbolic form [col. (a)].
2. Give the symbolic form that must be true when the original claim is false [col. (b)].
3. Of the two symbolic expressions obtained so far, let the alternative hypothesis H_1 be the one **not** containing equality, so that H_1 uses the symbol <> or ≠. Let the null hypothesis be the symbolic expression that the parameter **equals** the fixed value being considered.
4. Select the significance level α based on the seriousness of a type I error. Make α small if the consequences of rejecting a true H_0 are severe. The values of 0.05 and 0.01 are very common.
5. Identify the statistic that is relevant to this test and determine its sampling distribution (normal, *t*, chi-square).
6. (a) Find the test statistic (see Fig. 8-2). (b) Find the *P*-value (see Fig. 8-4).
7. Reject H_0 if the *P*-value is less than or equal to the significance level α. Fail to reject H_0 if the *P*-value is greater than α.
8. Restate this previous decision in simple, nontechnical terms, and address the original claim.

Stop

Procedure for Finding *P*-Values (Figure 8-4, page 403) – **(Step 6)**



Wording of the Final Conclusion (Table 8-3, page 405) – **(Step 8)**

Condition			Conclusion
Original claim (step 1) **does not** include equality	and	you reject H_0.	"There is sufficient evidence to *support* the clam that ... (original claim)"
Original claim (step 1) **does not** include equality	and	you fail to reject H_0.	"There is not sufficient evidence to support the clam that ... (original claim)"
Original claim (step 1) **does** include equality	and	you reject H_0.	"There is sufficient evidence to warrant *rejection* the clam that ... (original claim)"
Original claim (step 1) **does** include equality	and	you fail to reject H_0.	"There is not sufficient evidence to warrant rejection the clam that ... (original claim)"

CHAPTER 8 - HYPOTHESIS TESTING (CONTINUED)

Identify the Statistic Relevant to the Test and Determine its Sampling Distribution (Table 8-2, page 401) – **(Steps 5 and 6)**

Claim is about this parameter:	**Sampling distribution**	**Requirements**	**Test Statistic**
Proportion p	Normal (z)	$np \geq 5$ and $nq \geq 5$	$z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{pq}{n}}}$
Mean μ (where σ is **not** known)	t	σ is **not** known and one or both of these are satisfied: • The population is normally distributed. • The sample size $n > 30$.	$t = \dfrac{\bar{x} - \mu}{\dfrac{s}{\sqrt{n}}}$
Mean μ (where σ **is** known)	Normal (z)	σ **is** known and one or both of these are satisfied: • The population is normally distributed. • The sample size $n > 30$.	$z = \dfrac{\bar{x} - \mu}{\dfrac{\sigma}{\sqrt{n}}}$