In a criminal trial, the defendant is held to be innocent until shown to be guilty beyond a reasonable doubt. If we consider hypotheses

H_0: defendant is innocent

H_a: defendant is guilty

we can reject H_0 only if the evidence strongly favors H_a.

1. Is this goal better served by a test with $\alpha = 0.20$ or a test with $\alpha = 0.01$? Explain your answer.

2. Make a diagram that shows the truth about the defendant, and the possible verdicts and that identifies the two types of error. Which type of error is more serious?

3. Explain what is meant by the power of the test in this setting.

Read the brief newspaper article on using a depression pill to help smokers quit.

> **Depression Pill Seems to Help Smokers Quit**
> BOSTON — Taking an antidepression medicine appears to double smokers' chances of kicking the habit, a study found. The Food and Drug Administration approved the marketing of this medicine, called Zyban or bupropion, to help smokers in May. The results of several studies with the drug, including one published in today's issue of the *New England Journal of Medicine*, were made public then.
> The newly published study was conducted on 615 volunteers who wanted to give up smoking and were not outwardly depressed. They took either Zyban or dummy pills for 6 weeks. A year later, 23 percent of those getting Zyban were still off cigarettes, compared with 12 percent in the comparison group.

4. The results of this experiment were significant at the $\alpha = 0.05$ significance level. In your opinion, are the results practically significant? Justify your position.

5. To what population can the results of this study be generalized? Explain.

6. Can we conclude that taking Zyban *causes* people to quit smoking? Justify your answer.

7. In performing a test of significance, the researcher can choose between adopting a fixed significance level or calculating a *P*-value. Does it matter which approach is taken? If so, describe the circumstances when one should use each approach.