

Exam 4/Chapter 8

1) Answer true or false to each of the following:

- (a) ___ If the sample mean \bar{x} is less than 12, we can assume the population mean μ is also less than 12.
- (b) ___ If you fail to reject the null hypothesis you may have made a Type I error.
- (c) ___ If you reject the null hypothesis then the p-value is the probability you made a mistake.
- (d) ___ If you reject the null hypothesis at the $\alpha = 0.05$ level of significance then you will also reject the null hypothesis at the $\alpha = 0.01$ level of significance.
- (e) ___ Statistics has many, many, many real life applications.

For all hypothesis test questions, all parts of the test must be shown to receive full credit.

2) On election night 2004 exit polling in Kentucky showed that George Bush received 624 votes out of the 1050 randomly selected voters in the state. If George Bush was to receive more than 50% of the votes, he would win the state of Kentucky. The following null and alternate hypothesis was set up.

$$H_0 : p = 0.5$$

$$H_1 : p > 0.5$$

- (a) In the context of this problem, what is a type I error?

- (b) In the context of this problem, what is a type II error?

- (c) In your opinion, which error is worse? Why?

- (d) Finish the hypothesis test at the $\alpha = 0.01$ level of significance.

3) *Consumer Reports* reported that the mean braking distance (from 60 mph) on wet pavement for the Mercury Sable was 159 feet. Suppose that Sables equipped with tires having a new tread designed to grip the road better on wet pavement were used in 45 testes. The sample mean braking distance was $\bar{X} = 148$ feet with a sample standard deviation of $s = 23.5$ feet. Does this information indicate that the population mean braking distance with the new tires is less than 159 feet? Use $\alpha = 0.05$.

4) According to *A Guide to the Development and use of the Meyers-Briggs Type Indicator*, 60% of all computer programmers are introverts. Say 100 randomly selected computer programmers are selected.

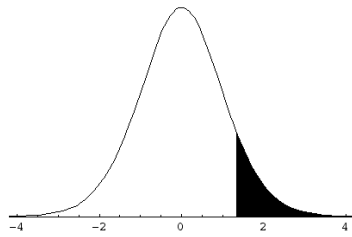
- (a) If 68 of the 100 computer programmers are found to be introverts, test the claim that more than 60% of computer programmers are introverts. Use $\alpha = 0.05$.

- (b) If 80 of the 100 computer programmers are found to be introverts, test the claim that more than 60% of computer programmers are introverts. Use $\alpha = 0.05$.

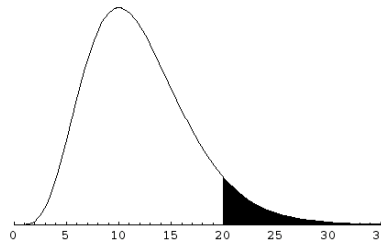
5) Systolic blood pressure results from contraction of the heart. Based on past results from the National Health Survey, it is claimed that women have systolic blood pressure with a standard deviation of 23.4. A random sample of 40 women's systolic blood pressure had a sample standard deviation of 17.7. Test the claim that the standard deviation is different from 23.4. Use $\alpha = 0.02$.

6) Find the areas under the curves for the given distributions:

(a) t-dist with 14 df. $P(t > 1.35)$



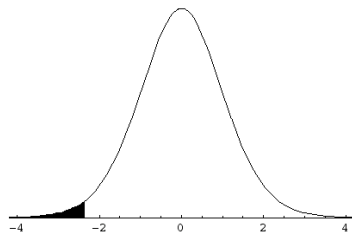
(b) χ^2 -dist with 12 df. $P(\chi^2 > 20)$



7) Find the number that will give the shaded area:

(a) t-distribution with 14 df.

Shaded Area: 0.0170



(b) χ^2 -dist with 12 df.

Shaded Area: 0.0669

