1. The use of preservatives by food processors has become a controversial issue. Suppose 2 preservatives are extensively tested and determined safe for use in meats. A processor wants to compare the preservatives for their effects on retarding spoilage. Suppose 15 cuts of fresh meat are treated with preservative I and 15 are treated with preservative II, and the number of hours until spoilage begins is recorded for each of the 30 cuts of meat. The results are summarized in the table below.

$$\text{Preservative I} \qquad\qquad \text{Preservative II}$$
$$\bar{X}_I = 106.4 \text{ hours} \qquad\qquad \bar{X}_{II} = 96.54 \text{ hours}$$
$$S_I = 10.3 \text{ hours} \qquad\qquad S_{II} = 13.4 \text{ hours}$$

(Assume alpha = 0.01).

a. What is the pooled variance to test the hypotheses for if the population means differ for preservatives I and II. Assuming equal population variances.

b. What is the test statistic value for the above test of part (a)?

c. What is the p-value of the test above?

2. To test the effectiveness of a business school preparation course, 5 students took a general business test before and after the course. The results are given below.

Student	Exam Score Before Course	Exam Score After Course
1	530	670
2	690	770
3	910	1,000
4	700	710
5	450	550

What is the test statistic value for testing at the 5% level of significance whether the business school preparation course is effective in improving exam scores?

3. Moving companies are required by the government to publish a Carrier Performance Report each year. One of the descriptive statistics they must include is the annual percentage of shipments on which a $50 or greater claim for loss or damage was filed. Suppose two companies, Econo-Move and On-the-Move, each decide to estimate this figure by sampling their records, and they report the data shown in the following table.

	Econo-Move	On-the-Move
Total shipments sampled	900	750
Number of shipments with a claim ≥ $50	162	60

The owner of On-the-Move is hoping to use these data to show that the company is superior to Econo-Move with regard to the percentage of claims filed. What is the p-value to properly analyze the data in this experiment?