

Group Work - Chapter 9

1 A coffee shop is interested in the proportion of decaf coffee drinkers on Sunday and Monday mornings. The manager thinks they have a lower proportion of decaf drinkers on Monday. They examine a random sample of coffee orders and find that on Sunday 52 out of 156 orders are for decaffeinated coffee and on Monday 43 out 174 are decaf orders.

(a) What are the null and alternative hypotheses for a test on this claim? Is this a one-sided or two-sided test? Are the requirements for a hypothesis test satisfied?

(b) Conduct an hypothesis test at the $\alpha = 0.05$ level of significance. Be sure to state your conclusion in the context of the question.

(c) Construct an appropriate confidence interval of the true difference of population proportions. What is your conclusion based on the confidence interval? Does it agree with the hypothesis test?

2 A manufacturer of flash drives wants to know if there is a difference in the reliability of their drives used in extreme conditions. A sample of 15 drives used in cold conditions ($< 32^{\circ}\text{F}$) had a mean lifespan of 41.9 months with a standard deviation of 6.3. A sample of 15 drives used in hot conditions ($> 99^{\circ}\text{F}$) had a mean lifespan of 38.4 months with a standard deviation of 5.9. Assume lifespans of flash drive are normally distributed.

(a) What are the null and alternative hypotheses for a test on this claim? Is this a one-sided or two-sided test? Are these independent or dependent samples? Are the requirements for a hypothesis test satisfied?

(b) Conduct an hypothesis test at the $\alpha = 0.05$ level of significance. Be sure to state your conclusion in the context of the question.

(c) Construct an appropriate confidence interval of the true difference of population means. What is your conclusion based on the confidence interval? Does it agree with the hypothesis test?

3 Researchers are interested in whether meditation can lower blood pressure in people that have high blood pressure. They conduct a study on 45 patients with high blood pressure (systolic blood pressure > 20), measuring their systolic blood pressure at baseline and after 30 minutes of meditation. The file “meditation_bp.csv” on D2L contains the data.

(a) What are the null and alternative hypotheses for a test on this claim? Is this a one-sided or two-sided test? Are these independent or dependent samples? Are the requirements for a hypothesis test satisfied?

(b) Conduct an hypothesis test at the $\alpha = 0.01$ level of significance. Be sure to state your conclusion in the context of the question.

(c) Construct an appropriate confidence interval of the true population mean of the differences. What is your conclusion based on the confidence interval? Does it agree with the hypothesis test?