

1. Ex 10.43 (revised) In an experiment designed to study the effects of illumination level on task performance (Performance of Complex Tasks Under Different Levels of Illumination, J. Illumin. Engrg., 1976: 235C242), subjects were required to insert a finetipped probe into the eyeholes of 10 needles in rapid succession both for a low light level with a black background and a higher level with a white background. Each data value is the time (sec) required to complete the task.

subject	1	2	3	4	5	6	7	8	9
Black	25.85	28.84	32.05	25.74	20.89	41.05	25.01	24.96	17.47
White	18.23	20.84	22.96	19.68	19.50	24.98	16.61	16.07	24.59

- Does the data indicate that the higher level of illumination yields a decrease of more than 5 s in true average task completion time? Set  $\alpha = 0.05$ .
  - Calculate a lower 95% confidence bound for the population mean difference.
2. Ex 10.44 It has been estimated that between 1945 and 1971, as many as 2 million children were born to mothers treated with diethylstilbestrol (DES), a nonsteroidal estrogen recommended for pregnancy maintenance. The FDA banned this drug in 1971 because research indicated a link with the incidence of cervical cancer. The article "Effects of Prenatal Exposure to Diethylstilbestrol (DES) on Hemispheric Laterality and Spatial Ability in Human Males" (Hormones Behav., 1992: 6275) discussed a study in which 10 males exposed to DES and their unexposed brothers underwent various tests. This is the summary data on the results of a spatial ability test:  $\bar{x} = 12.6$  (exposed),  $\bar{y} = 13.7$ , and standard error of mean difference = .5. Test at level .05 to see whether exposure is associated with reduced spatial ability by obtaining the P-value.
  3. Ex 10.53 Ionizing radiation is being given increasing attention as a method for preserving horticultural products. The article The Influence of Gamma- Irradiation on the Storage Life of Red Variety Garlic reports 153 of 180 irradiated garlic bulbs were marketable (no external sprouting, rotting, or softening) 240 days after treatment, whereas 119 of 180 untreated bulbs were marketable after this length of time. Does this data suggest that ionizing radiation is beneficial as far as marketability is concerned?
  4. Ex 10.50 (extra credits 15) It is thought that the front cover and the nature of the first question on mail surveys influence the response rate. The article The Impact of Cover Design and First Questions on Response Rates for a Mail Survey of Skydivers tested this theory by experimenting with different cover designs. One cover was plain; the other used a picture of a skydiver. The researchers speculated that the return rate would be lower for the plain cover.

Cover	Number Sent	Number Returned
Plain	207	104
Skydiver	213	109

Does this data support the researchers' hypothesis? Test the relevant hypotheses using a  $\alpha = 0.1$  by first calculating a P-value.