1. A machine is set produce tennis balls so the mean bounce is 36 inches when the ball is dropped from a platform of a certain height. The productions supervisor suspects that the mean bounce has changed and is less than 36 inches. As an experiment a sample of 12 balls was dropped from the platform and the mean height of the bounce was 35.5 inches, with a standard deviation of 0.9 inches. At the .05 significance level, can the supervisor conclude that the mean bounce height is less than 36 inches?
2. Research by First Bank of Illinois revealed that 8 percent of its customers wait more than five minutes to do their banking when not using the drive-through facility. Management considers this reasonable and will not add more tellers unless the proportion becomes larger that 8 percent. The branch manager at the Litchfield Branch believes that the wait is longer than the standard at her branch and requested additional part-time tellers. To support her request she found that, in a sample of 100 customers, 10 waited more than five minutes. At the .01 significance level, is it reasonable to conclude that more than 8 percent of the customers wait more than five minutes?
3. It was hypothesized that road construction workers do not engage in productive work 20 minutes on the average out of every hour. Some claimed the nonproductive time is greater than 20 minutes. An actual study was conducted at a construction site, using a stopwatch and other ways of checking the work habits. A random check of workers revealed the following unproductive times, in minutes, during a one-hour period (exclusive of regularly scheduled breaks):

10 25 17 20 28 30 18 23 18

Using the .05 significance level, is it reasonable to conclude the mean unproductive time is greater than 20 minutes?

1. A test is to be conducted involving the mean holding power of two glues designed for plastic. First, a small plastic hook was coated at one end with Epox glue and fastened to a sheet of plastic. After it dried, weight was added to the hook until it separated from the sheet of plastic.

The weight was then recorded. This was repeated until 12 hooks were tested. The same procedure was followed for Holdtite glue, but only 10 hooks were used. The sample results, in

pounds, were:

**Epox Holdtite**

Sample mean 250 252

Sample standard deviation 5 8

Sample size 12 10

At the .01 significance level, is there a difference between the mean holding power of Epox and

that of Holdtite?

1. Pittsburgh Paints wishes to test an additive formulated to increase the life of paints used in the hot and arid conditions of the Southwest. The top half of a piece of wood was painted using the

regular paint. The bottom half was painted with the paint including the additive. The same procedure was followed for a total of 10 pieces. Then each piece was subjected to brilliant light.

The data, the number of hours each piece lasted before it faded beyond a certain point, follow:

(See next page..)

**Number of Hours by Sample**

**A B C D E F G H I J**

Without additive 325 313 320 340 318 312 319 330 333 319

With additive 323 313 326 343 310 320 313 340 330 315

Using the .05 significance level, determine whether the additive is effective in prolonging the life

of the paint.