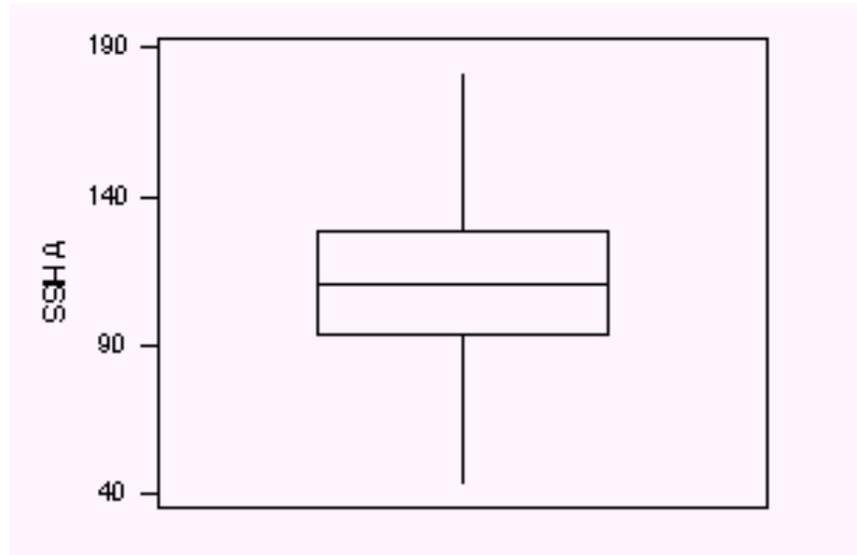


Review Problems for Exam 1

1. The scores on the Survey of Study Habits and Attitudes (SSHA) for a sample of 150 first-year college women produced the following box plot



The statistical summary for the scores is

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
42.49	93.26	110.68	111.63	129.23	182.71

Estimate the number of women in the study with scores between 93.26 and 129.23.

2. The ages of the hourly paid workers at Westaco involved in the second round of layoffs that the Envelope Division of the company went through in 1991 are listed here below in increasing order.

25, 33, 35, 38, 48, 55, 55, 55, 56, 64

The underlined numbers are the ages of the workers that were laid off in the second round.

- Compute the median age all the ages given above.
- Compute the median age the workers that were laid off and compared it to the median age of those that were kept.

- (c) Set up a procedure to test the hypothesis that Westvaco selected the three workers for layoffs at random using the median age as a test statistic.
- (d) Define the p -value for the hypothesis test formulated in the previous part.
- (e) Describe a randomization procedure that you may use to estimate the p -value.
- (f) Figure 1 shows the histogram of the medians of the 10,000 samples of size three selected at random from the 10 ages.

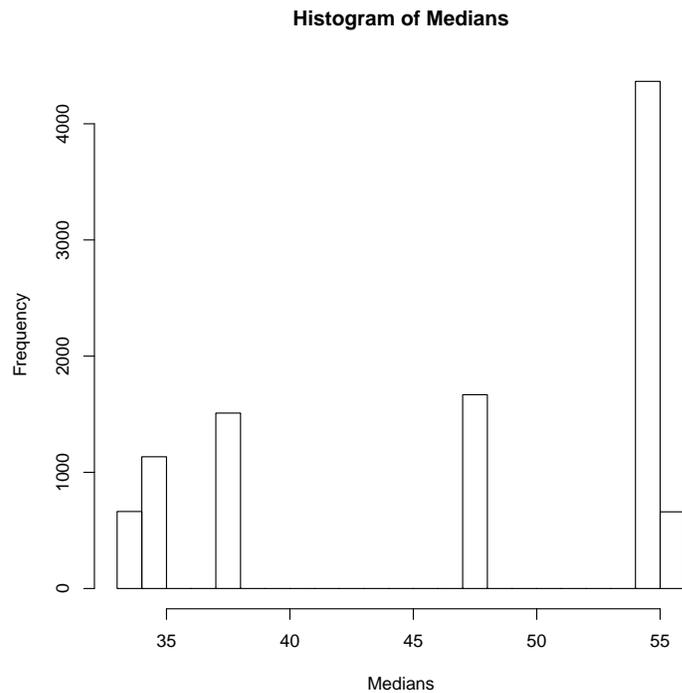


Figure 1: Sampling Distribution for the Median

Use the histogram in Figure 1 to estimate the p -value. What do you conclude?

3. Refer to the ages of the 10 hourly paid workers listed in the previous problem.
- (a) Use the median of the ages of the workers that were laid off as a threshold to separate the workers into two classes: those whose age is above or equal to that value and those whose age is below the threshold. Based on this splitting, complete the Table 1

Age \geq threshold? \ Fired?	No	Yes	Total
Yes	2		
No	5		
Total			

Table 1: Observed Values

- (b) If the company did the selection at random, how many ages would you expect to see in each category in the table? Write your answers in Table 2

Age \geq threshold? \ Fired?	No	Yes	Total
Yes			
No			
Total			

Table 2: Expected Values

4. Refer to the setup given in the previous problem.

In the previous problem, you found that if you divide the hourly paid workers involved in the second round of layoffs into two groups: Older (age larger than or equal to a threshold) and Younger (age below the threshold); then, more people in the Older group were laid off than in the Younger group. Perform a test to determine whether this difference is statistically significant.

5. The table below shows a values of a random variable X and its probability distribution

Values of X	1	2	3
Probability	0.2	0.6	0.2

- (a) Find the mean and standard deviation of X .
- (b) Construct a different probability distribution with the same possible values, the same mean, and a larger standard deviation.
- (c) Construct a different probability distribution with the same possible values, the same mean, and a smaller standard deviation.