

than psi. Is it necessary to reexpress each observation in ksi, or can the values calculated in part (a) be used directly? *Hint:* 1 kg = 2.2 lb.

36. A sample of 26 offshore oil workers took part in a simulated escape exercise, resulting in the accompanying data on time (sec) to complete the escape ("Oxygen Consumption and Ventilation During Escape from an Offshore Platform," *Ergonomics*, 1997: 281-292):

389 356 359 363 375 424 325 394 402  
 373 373 370 364 366 364 325 339 393  
 392 369 374 359 356 403 334 397

- a. Construct a stem-and-leaf display of the data. .736  
 How does it suggest that the sample mean and median will compare? 1.01!
- b. Calculate the values of the sample mean and median. *Hint:*  $\sum x_i = 9638$ .
- c. By how much could the largest time, currently 424, be increased without affecting the value of the sample median? By how much could this value be decreased without affecting the value of the sample median? 40.
- d. What are the values of  $\bar{x}$  and  $\bar{y}$  when the observations are reexpressed in minutes?

~~39. The article "Snow Cover and Temperature Relation" 41.~~

#42

- a. If a constant  $c$  is added to each  $x_i$  in a sample, yielding  $y_i = x_i + c$ , how do the sample mean and median of the  $y_i$ 's relate to the mean and median of the  $x_i$ 's? Verify your conjectures.
- b. If each  $x_i$  is multiplied by a constant  $c$ , yielding  $y_i = cx_i$ , answer the question of part (a). Again, verify your conjectures.

43. An experiment to study the lifetime (in hours) for a

87 93 96 98 105 114 128 131 142 168

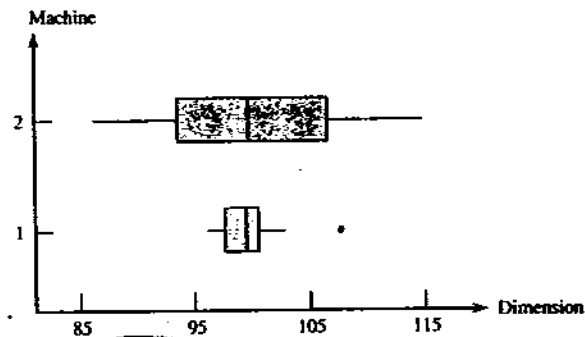
48. Exercise 36 in Section 1.3 presented a sample of 26 escape times for oil workers in a simulated escape exercise. Calculate and interpret the sample standard deviation. (*Hint:*  $\sum x_i = 9638$  and  $\sum x_i^2 = 3,587,566$ .)
49. A study of the relationship between age and various visual functions (such as acuity and depth perception) reported the following observations on area of scleral lamina (mm<sup>2</sup>) from human optic nerve heads ("Morphometry of Nerve Fiber Bundle Pores in the Optic Nerve Head of the Human," *Experimental Eye Research*, 1988: 559-568):

efinition (i.e., when squaring

- a. Determine the value of the fourth spread.  
 b. Are there any outliers in the sample? Any extreme outliers?  
 c. Construct a boxplot and comment on its features.

58. A company utilizes two different machines to manufacture parts of a certain type. During a single shift, a sample of  $n = 20$  parts produced by each machine is obtained, and the value of a particular critical dimension for each part is determined. The

Comparative boxplot for Exercise 58



comparative boxplot at the bottom of page 46 is constructed from the resulting data. Compare and contrast the two samples.

resulting from these three measurements

64. The amount of radiation received at a greenhouse plays an important role in determining the rate of photosynthesis. The accompanying observations on incoming solar radiation were read from a graph in the article "Radiation Components over Bare and Planted Soils in a Greenhouse" (*Solar Energy*, 1990: 1011-1016).

|      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|
| 6.3  | 6.4  | 7.7  | 8.4  | 8.5  | 8.8  | 8.9  |
| 9.0  | 9.1  | 10.0 | 10.1 | 10.2 | 10.6 | 10.6 |
| 10.7 | 10.7 | 10.8 | 10.9 | 11.1 | 11.2 | 11.2 |
| 11.4 | 11.9 | 11.9 | 12.2 | 13.1 |      |      |

quartiles, and comment on what you see.

72. Anxiety disorders and symptoms can often be effectively treated with benzodiazepine medications. It is known that animals exposed to stress exhibit a decrease in benzodiazepine receptor binding in the frontal cortex. The paper "Decreased Benzodiazepine Receptor Binding in Prefrontal Cortex in Combat-Related Posttraumatic Stress Disorder"

(*Amer. J. of Psychiatry*, 2000: 1120-1126) described the first study of benzodiazepine receptor binding in individuals suffering from PTSD. The accompanying data on a receptor binding measure (adjusted distribution volume) was read from a graph in the paper.

PTSD: 10, 20, 25, 28, 31, 35, 37, 38, 38, 39, 39, 42, 46

Healthy: 23, 39, 40, 41, 43, 47, 51, 58, 63, 66, 67, 69, 72

Use various methods from this chapter to describe and summarize the data.