Solutions Manual

to accompany

PRINCIPLES OF STATISTICS FOR ENGINEERS AND SCIENTISTS

by

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Chapter 1

Section 1.1

1. (a) The population consists of all the bolts in the shipment. It is tangible.

   (b) The population consists of all measurements that could be made on that resistor with that ohmmeter. It is conceptual.

   (c) The population consists of all residents of the town. It is tangible.

   (d) The population consists of all welds that could be made by that process. It is conceptual.

   (e) The population consists of all parts manufactured that day. It is tangible.

3. (a) False

   (b) True

5. (a) No. What is important is the population proportion of defectives; the sample proportion is only an approximation. The population proportion for the new process may in fact be greater or less than that of the old process.

   (b) No. The population proportion for the new process may be 0.12 or more, even though the sample proportion was only 0.11.

   (c) Finding 2 defective circuits in the sample.

7. A good knowledge of the process that generated the data.

Section 1.2

1. (a) The mean will be divided by 2.2.

   (b) The standard deviation will be divided by 2.2.

3. False

5. No. In the sample 1, 2, 4 the mean is 7/3, which does not appear at all.

7. The sample size can be any odd number.

9. Yes. If all the numbers in the list are the same, the standard deviation will equal 0.

11. The sum of the mens' heights is $20 \times 178 = 3560$. The sum of the womens' heights is $30 \times 164 = 4920$. The sum of all 50 heights is $3560 + 4920 = 8480$. Therefore the mean score for the two classes combined is $8480/50 = 169.6$.

13. (a) All would be divided by 2.54.

    (b) Not exactly the same, because the measurements would be a little different the second time.

15. (a) The sample size is $n = 16$. The tertiles have cutpoints $(1/3)(17) = 5.67$ and $(2/3)(17) = 11.33$. The first tertile is therefore the average of the sample values in positions 5 and 6, which is $(44+46)/2 = 45$. The second tertile is the average of the sample values in positions 11 and 12, which is $(76+79)/2 = 77.5$.

    (b) The sample size is $n = 16$. The quintiles have cutpoints $(i/5)(17)$ for $i = 1, 2, 3, 4$. The quintiles are therefore the averages of the sample values in positions 3 and 4, in positions 6 and 7, in positions 10 and 11, and in positions 13 and 14. The quintiles are therefore $(23 + 41)/2 = 32$, $(46 + 49)/2 = 47.5$, $(74 + 76)/2 = 75$, and $(82 + 89)/2 = 85.5$.