

**AP Statistics**  
**Chapter 5 Classwork**

Life expectancy in the United States varies a bit from state to state. The lowest life expectancy at birth in 2012, 73.09 years, was in the District of Columbia. The highest, 80.23 years, was in Hawaii. The mean of all the state life expectancies is 77.19 years, with a standard deviation of 1.57 years.

1.
  - a. Calculate the  $z$ -score for Washington, D.C.
  - b. Interpret this  $z$ -score in context.
  
2.
  - a. Connecticut has a  $z$ -score of 1.09. Interpret this  $z$ -score in context.
  - b. Calculate the life expectancy at birth for Connecticut.

Life expectancy varies by race as well. Blacks in the United States tend to have shorter lives than whites. The mean of the state average life expectancies at birth for whites is 77.96 years, and the standard deviation is 1.29 years. For blacks, the mean is 72.33 years with a standard deviation of 1.46 years. The state with the longest life expectancy for blacks is Massachusetts at 76.36 years. For whites, the longest life expectancy is in the District of Columbia at 81.54 years.

3.
  - a. Which of these life expectancies is more extreme for the population?
  - b. Use  $z$ -scores to explain your answer to part a.
  
4. Connecticut has a  $z$ -score of 1.70 for life expectancies for blacks and 1.09 for whites.
  - a. What is the life expectancy at birth for blacks in Connecticut? For whites?
  - b. You are asked what percentage of states have lower life expectancy for blacks than Connecticut. Explain why you don't have enough information to answer that question.
  
5. The Wechsler Adult Intelligence Scale – Revised (WAIS-R) follow a Normal model with mean 100 and standard deviation 15. Draw and clearly label this model.

6. Students taking an intro stats class reported the number of credit hours that they were taking that quarter. Summary statistics are shown in the table.

a. Suppose that the college charges \$73 per credit hour plus a flat student fee of \$35 per quarter. For example, a student taking 12 credit hours would pay  $\$35 + \$73(12) = \$911$  for that quarter.

- i. What is the mean fee paid?
- ii. What is the standard deviation for the fees paid?
- iii. What is the median fee paid?
- iv. What is the IQR for the fees paid?

|           |       |
|-----------|-------|
| $\bar{x}$ | 16.65 |
| $s$       | 2.96  |
| min       | 5     |
| Q1        | 15    |
| median    | 16    |
| Q3        | 19    |
| max       | 28    |

b. Twenty-eight credit hours seems like a lot. Would you consider 28 credit hours to be unusually high? Explain.

7. Adult female Dalmatians weigh an average of 50 pounds with a standard deviation of 3.3 pounds. Adult female Boxers weigh an average of 57.5 pounds with a standard deviation of 1.7 pounds. One statistics teacher owns an underweight Dalmatian and an underweight Boxer. The Dalmatian weighs 45 pounds, and the Boxer weighs 52 pounds. Which dog is more underweight? Explain.

8. Human body temperatures taken through the ear are typically  $0.5^\circ\text{F}$  higher than body temperatures taken orally. Making this adjustment and using the 1992 *Journal of the American Medical Association* article that reports average oral body temperature as  $98.2^\circ\text{F}$ , we will assume that a Normal model with an average of  $98.7^\circ\text{F}$  and a standard deviation of  $0.7^\circ\text{F}$  is appropriate for body temperatures taken through the ear.

a. An ear temperature of  $97^\circ\text{F}$  may indicate hypothermia (low body temperature). What percent of people have ear temperatures that may indicate hypothermia?

b. Find the interquartile range for ear temperatures.

c. A new thermometer for the ear reports that it is more accurate than the ear thermometers currently on the market. If the average ear temperature reading remains the same and the company reports an IQR of  $0.5^\circ\text{F}$ , find the standard deviation for this new ear thermometer.