

Course 2 Unit 6 Practice

LESSON 24-1

Suppose you want to learn about what the favorite holidays of your family members are.

1. You send all of your family members an email that they return indicating what their favorite holiday is. Is this a census? Justify your reasoning.
2. You ask only the members of your family that you can contact by phone what their favorite holiday is. Is this a census? Justify your reasoning.
3. Nick collects data from all of the boys in seventh grade. For what population can he make accurate statements?
4. **Reason abstractly.** You want to find out how many minutes of homework students in eighth grade have. Describe a population for which you can perform a census.
5. Angela asks all the girls on the basketball team where they would like to stop and eat after the game. For what population is this a census?

LESSON 24-2

Every year, the National Geographic Society holds a National Geography Bee for middle school students. Students are selected to compete in the National Geography Bee by placing first in their State Geography Bee. Students are entered in their State Geography Bee by placing first in their local school Geography Bee. You want to learn about the GPAs (grade point averages) of students who are competing at the National Geography Bee.

6. What is the population that you want to learn about?
7. If you wanted to do a census of this population, from how many students would you need to collect data?
8. **Model with mathematics.** Describe how you could select a random sample of this population.
9. **Critique the reasoning of others.** Gabe has a plan to collect data from the National Geography Bee students who live in the southwest corner of the United States. Is Gabe's plan a good idea? Explain why or why not.

10. If you decided to contact 20 students to obtain their GPA information and you assigned each of these students a two-digit number, how many random digits would you need to use for this process?

LESSON 25-1

Scenario A: The students in second-period math want to learn more about the ages of Olympic athletes. They decide to use a sample size of 15 Olympic athletes to collect age data on.

Scenario B: The students in fifth-period math also want to learn about the ages of Olympic athletes. They decide to use a sample size of 100 Olympic athletes.

11. **Construct viable arguments.** In which scenario above is the sampling variability greater? Explain your choice.
12. If seventh-period math wanted to learn about the ages of all Olympic athletes, would you recommend that they use a sample size of 10 or 75? Justify your choice.

The numbers below represent the heights (in feet and inches) of 17 United States athletes competing in the 2014 Winter Olympic games. Use this information for Items 13 and 14.

5'6" 5'0" 6'0" 6'2" 5'5" 5'9" 5'5" 5'8" 5'9"
5'7" 6'0" 5'5" 5'7" 6'1" 5'7" 5'8" 5'8"

13. **Reason quantitatively.** Calculate the sample mean for this sample to the nearest inch.
14. There are 230 athletes competing for the United States in the 2014 Olympic Games. How would the size of the samples need to be changed in order to decrease sampling variability from the sample above?
15. **Attend to precision.** How is the sample mean different from the population mean?

LESSON 25-2

16. **Construct viable arguments.** Suppose that you are going to select a random sample of students from your school, ask how far away from the school they live in blocks, and then find the mean distance for your sample. There are many different sets of students who could end up forming your sample. Will the sample mean be the same for all possible samples? If so, explain why. If not, what do we call the difference between sample means?
17. How could you reduce the variation between sample means in Item 16?

Suppose that 80% of the students at your school favor a change in school policy requiring that the school breakfast and lunch programs use more locally grown foods in their meals. Also suppose that the students in your class each chose a different random sample of 30 students in your school and calculated the proportion of students in the sample who favor this change.

18. Reason quantitatively. If you constructed a class dot plot of the sample proportions, where would you expect the dot plot to be centered? Explain your reasoning.

19. How would the spread on the class dot plot change if the sample size was changed to 10 students?

20. How would the spread on the class dot plot change if the sample size was changed to 60 students? Justify your response.

LESSON 26-1

21. Make sense of problems. Suppose that the mean GPA (grade point average) for a random sample of all seventh graders at your school is 3.25 and the mean GPA for a random sample of all eighth graders at your school is 2.85. Explain why this does not tell us that the mean GPA of all seventh graders at your school is different from the mean GPA of all eighth graders at your school.

The data below shows the average time in minutes spent on homework each night by seventh and eighth graders at Wedgeway Middle School.

7th Graders: 20, 35, 55, 10, 45, 25, 60, 85, 15, 25

8th Graders: 35, 50, 70, 25, 60, 40, 75, 100, 30, 40

22. Calculate the sample mean and sample median of each data set.

23. Based on the sample means, would you conclude that the homework times for all seventh graders at the school and the homework times for all eighth graders at the school are different? Explain.

24. Attend to precision. Draw a box plot for each data set on the same scale.

25. Based on the comparison of the box plot, do you conclude that the population means of the seventh grade and eighth grade homework times show a meaningful difference? Explain.

LESSON 26-2

For each of the following populations, indicate whether you would conclude that the population means might be equal or the population means are probably different. Justify your choice.

26.

- Population 1: U.S. Census at School seventh graders
 - Population 2: U.S. Census at School eighth graders
 - Variable of interest: Hours spent outside per week
 - The two populations both have a MAD of about: 7.29
 - Sample size: 25
 - Mean of random sample from Population 1: 11.52
 - Mean of random sample from Population 2: 9.24
- a. Construct viable arguments.** Conclusion and justification:
- b.** Does this lead you to think that the mean time spent outside for seventh graders and the mean time spent outside for eighth graders are different?

27.

- Population 1: U.S. Census at School seventh graders
 - Population 2: U.S. Census at School eighth graders
 - Variable of interest: Hours spent watching television
 - The two populations both have a MAD of about: 11.94
 - Sample size: 25
 - Mean of random sample from Population 1: 14.92
 - Mean of random sample from Population 2: 10.92
- a.** Conclusion and justification:
- b.** Does this lead you to think that the mean distance from school to home for seventh graders and the mean distance from school to home for eighth graders are different?

LESSON 26-3

- 28.** Suppose that the mean number of hours spent practicing a musical instrument per week for a random sample of 20 girls selected from the students at Wedgeway Middle School was 3.4 hours.
- a.** If you were to select a second random sample of 20 girls from this school, do you think the mean for this second sample would also be 3.4 hours? Explain why or why not.
- b.** Suppose a random sample of 20 boys was selected from this school and that the mean hour spent practicing a musical instrument was 2.8 hours. This sample mean is different from the sample mean for the girls. Explain why this does not necessarily mean that the mean number of hours spent practicing a musical instrument for the population of all girls at the school is different than the mean for all boys at the school.

29. Calculate the sample mean and MAD for each of the two samples. You can use the tables below to help organize your work for computing the MADs.

Seventh	Graders
Data Value	Distance from the mean
180	
60	
76	
35	
0	
110	
20	
56	
40	
35	

Eighth	Graders
Data Value	Distance from the mean
95	
55	
50	
75	
95	
10	
35	
40	
20	
65	

30. Average the two sample MADs to get a common estimate of the population MADs.
31. Express the difference in the two sample means in terms of the common MAD.
32. **Make use of structure.** Based on the difference in sample means, do you think that the mean number of hours spent on social media for seventh graders and eighth graders are probably different or do you think they might be the same?
33. Suppose the two sample sizes had been 30 instead of 10, but that the sample means and the MADs remained the same. How would your answer to the item above change? Explain your response.