

Learning Task: If the Shoe Fits!

Name _____

Date _____

Shoe Print Length	Height	Gender
24	71	F
32	74	M
27	65	F
26	64	F
25.5	64	F
30	65	M
31	71	M
29.5	67	M
29	72	F
25	63	F
27.5	72	F
25.5	64	F
27	67	F
31	69	M
26	64	F
27	67	F
28	67	F
26.5	64	F
22.5	61	F
24.5	68.5	F
22.5	59	F
29	74	M
24.5	61	F
25	66	F
37	72	M
27	67	F
32.5	70	M
27	66	F
27.5	65	F
25	62	F
31	69	M
32	72	M
27.4	67	F
30	71	M
25	67	F
26.5	65.5	F
30	70	F
31	66	F
27.25	67	F

Welcome to CSI at School! Over the weekend, a student entered the school grounds without permission. Even though it appears that the culprit was just looking for a quiet place to study undisturbed by friends, school administrators are anxious to identify the offender and have asked for your help. The only available evidence is a suspicious footprint outside the library door.

After the incident, school administrators arranged for the data in the table below to be obtained from a random sample of this high school's students. The table shows the shoe print length (in cm), height (in inches), and gender for each individual in the sample.

1. Explain why this study was an observational study and not an experiment.
2. Why do you think the school's administrators chose to collect data on a random sample of students from the school? What benefit might a random sample offer?
3. Suggest a graph that might be used to use to compare the shoe print length data distributions for females and males.
4. Describe one advantage of using comparative box plots instead of comparative dot plots to display these data.

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5. For each gender calculate the five-number summary for the shoe print lengths. Additionally, for each gender, determine if there are any outlying shoe print length values.

6. Construct comparative box plots for the shoe print lengths of males and females. Discuss the similarities and differences in the shoe print length distributions for the males and females in this sample.

7. For each gender calculate the mean shoe print length. What information does the mean shoe print length provide?

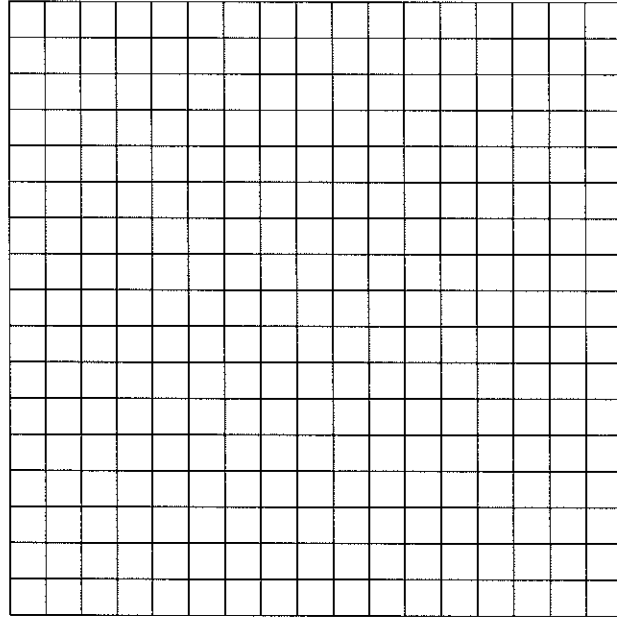
8. The mean will give us an indication of a typical shoe print length. In addition to knowing a typical length we would also like to know how much variability to expect around this length. For each gender calculate the Range; Interquartile Range; and Mean Absolute Deviation of the shoe print lengths. Interpret each of the calculated values.

9. If the length of a student's shoe print was 32 cm, would you think that the print was made by a male or a female? How sure are you that you are correct? Explain your reasoning. Use results from Questions 5 through 8 in your explanation.

10. How would you answer Question 9 if the suspect's shoe print length was 27 cm?

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- 11.** Construct a scatter plot of height (vertical scale) versus shoe print length (horizontal scale) using different colors or different plotting symbols to represent the data for males and females.



- a.** Interpret the scatter plot. Does it look like there is a linear relationship between height and shoe print length? Explain.
- b.** Does it look like the same straight line could be used to summarize the relationship between shoe print length and height for both males and females? Explain.
- c.** Based on the scatter plot, if a student's shoe print length was 30 cm, approximately what height would you predict for the person who made the shoe print? Explain how you arrived at your prediction.