

Exploring One-Variable Data: Shape, Center, Spread

Grade 12 – AP Statistics math · Worksheet · Standards: AP Statistics Unit 1 (2026-27)

Name: _____ Date: _____ Class: _____

These twenty problems train the core skills of AP Statistics Unit 1: classifying variables, reading graphs, computing summary statistics, applying outlier rules, standardizing with z-scores and using normal models. Problems rise from short calculations to multi-step contexts.

Standards: AP Statistics Unit 1 (2026-27) · **Level:** Grade 12 AP Statistics

Problem 1 Classifying Variables (easy)

A school nurse records four pieces of information for each student. Classify each variable as categorical or quantitative.

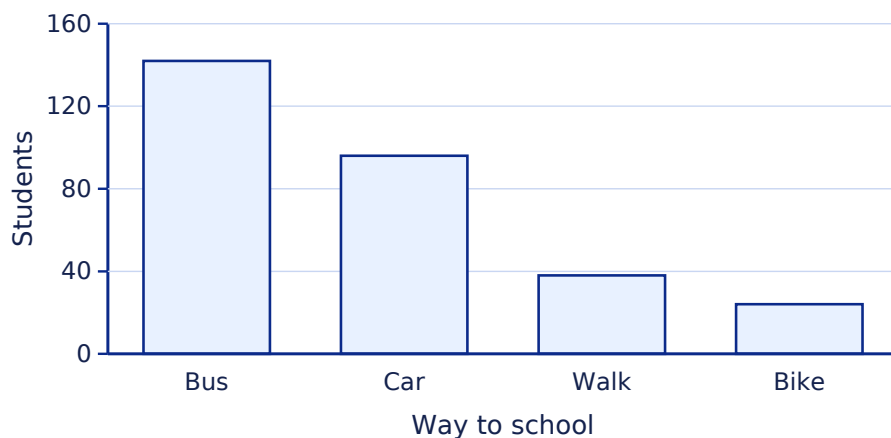
- a. Blood type
- b. Height in inches
- c. Number of siblings
- d. Home zip code

Problem 2 Relative Frequency Table (easy)

At a food-truck festival, 50 visitors chose a favorite cuisine: tacos 18, BBQ 14, pizza 11, ramen 7. Calculate the relative frequency of each cuisine as a percent.

Problem 3 Reading a Bar Graph (easy)

The bar graph shows how students at Lakeview Middle get to school.



How students at Lakeview Middle get to school.

- Find the total number of students surveyed.
- What percent of the students are driven in a car?
- How many more students ride the bus than walk?

Problem 4 Mean and Median of Scores (easy)

A robotics team scored 14, 9, 22, 17, 11, 19, 15, 28, 13 points in nine rounds. Find the mean and the median.

Problem 5 Five-Number Summary (easy)

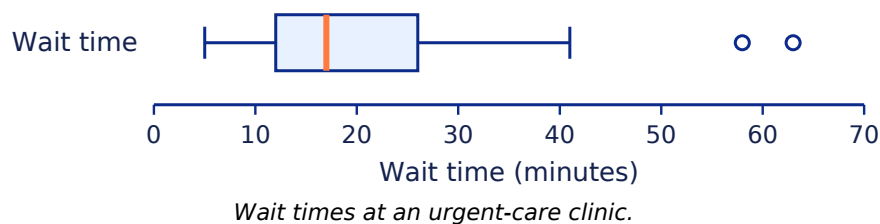
Eleven chess players finished a tournament with these scores: 52, 61, 47, 70, 58, 66, 49, 73, 55, 64, 59. Find the five-number summary.

Problem 6 Range and IQR (easy)

The five-number summary of the daily tips earned by a waiter is: minimum \$8, $Q_1 = \$15$, median = \$21, $Q_3 = \$29$, maximum \$52. Find the range and the IQR. Is \$52 an outlier by the $1.5 \times \text{IQR}$ rule?

Problem 7 Checking Plotted Outliers (medium)

The boxplot summarizes wait times at an urgent-care clinic. Use the values $Q_1 = 12$ and $Q_3 = 26$ to show that the two circled values, 58 and 63, are outliers.

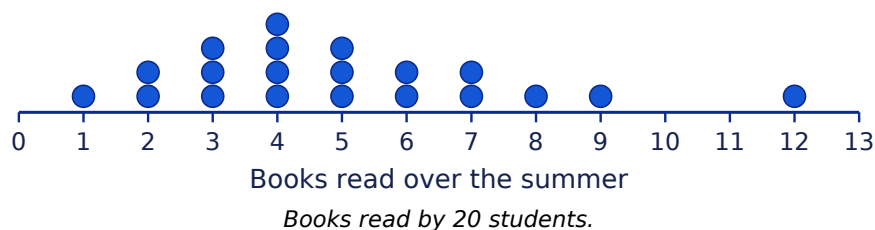


Problem 8 Standard Deviation by Hand (medium)

A lemonade stand sold 23, 31, 27, 35, 19 cups on five days. Calculate the sample standard deviation.

Problem 9 Percentile from a Dotplot (medium)

The dotplot shows the number of books read over the summer by 20 students. Find the percentile of a student who read 7 books, and describe the shape.

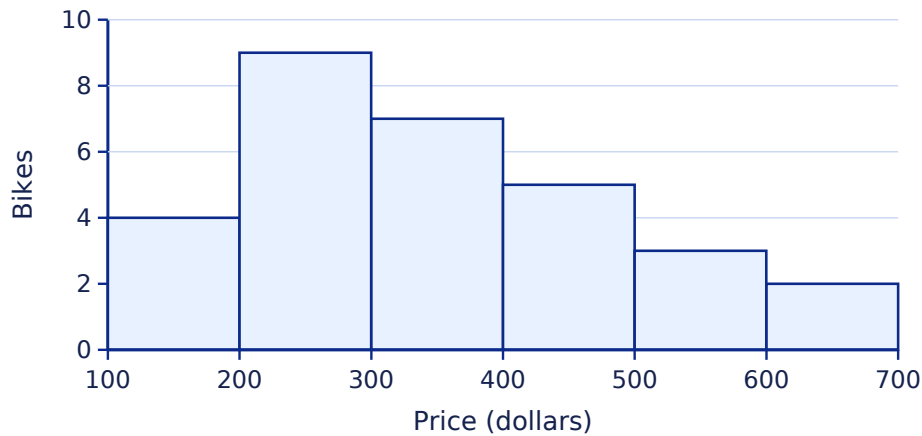


Problem 10 Computing z-Scores (medium)

Daily high temperatures at a campsite in July have mean 86.4°F and standard deviation 4.8°F . Find the z-score of a day with a high of 95.0°F and of a day with a high of 79.2°F .

Problem 11 Reading a Histogram (medium)

The histogram shows prices of 30 used bikes at a swap meet.



Prices of 30 used bikes.

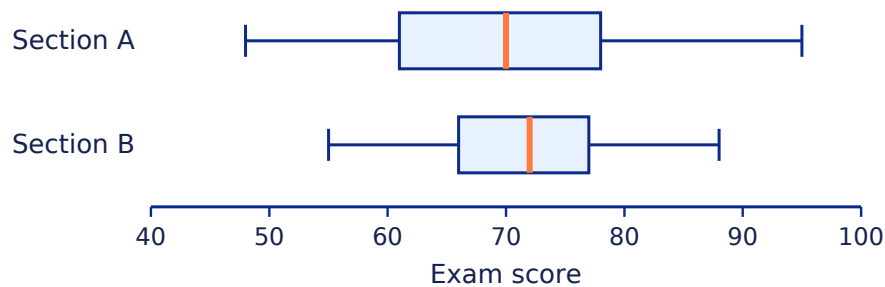
- Describe the shape.
- In which interval does the median lie?
- What percent of the bikes cost \$400 or more?
- Which should be larger, the mean or the median?

Problem 12 Effect of an Outlier (medium)

Five delivery times (minutes) are 12, 14, 15, 17, 18. The last value is mistakenly recorded as 58. Find the mean, median and range before and after the change.

Problem 13 Comparing Two Distributions (medium)

Two sections of a course took the same exam.



Exam scores in two sections of the same course.

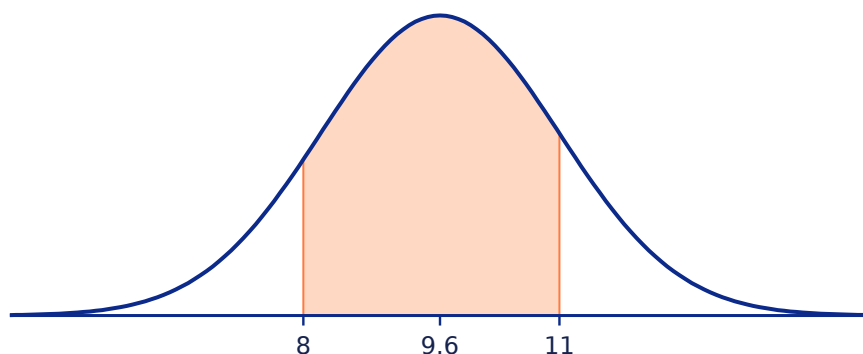
Compare the center and spread of the two distributions in context.

Problem 14 Using the Empirical Rule (medium)

The mass of bags of trail mix is approximately normal with mean 250 g and standard deviation 12 g. Use the empirical rule to find the percent of bags that have a mass (a) between 226 g and 274 g, (b) between 238 g and 262 g, (c) above 286 g.

Problem 15 Normal Probability Between Values (hard)

The battery life of a tablet is approximately normal with mean 9.6 hours and standard deviation 1.4 hours. Find the proportion of tablets whose battery lasts between 8.0 and 11.0 hours.



Battery life (hours); the shaded region is between 8.0 and 11.0.

Problem 16 Finding a Percentile Value (hard)

Times to finish a puzzle are approximately normal with mean 48 minutes and standard deviation 7.5 minutes. A prize goes to solvers faster than the 10th percentile. What time earns the prize? Also find the 90th percentile.

Problem 17 Comparing Standardized Scores (hard)

Dana earned 83 on a math test (class mean 74, standard deviation 6) and 91 on a science test (class mean 82, standard deviation 11). On which test did Dana perform better relative to classmates? Justify with z-scores.

Problem 18 Two Outlier Rules (hard)

Members of a climbing gym visited a mean of 18.4 times last quarter with a standard deviation of 4.1. The quartiles were $Q_1 = 15$ and $Q_3 = 21$. A member visited 27 times. Decide whether this member is an outlier (a) by the 2-standard-deviation rule and (b) by the $1.5 \times \text{IQR}$ rule.

Problem 19 Changing Units of Measurement (hard)

Morning temperatures in a greenhouse have mean 18.5°C , median 19°C , standard deviation 2.5°C and IQR 3.5°C . Converting to $^\circ\text{F}$ uses $F = 1.8C + 32$. Find the mean, median, standard deviation and IQR in $^\circ\text{F}$.

Problem 20 Finding an Unknown Spread (hard)

The weight of bags of potting soil is approximately normal with mean 14.2 pounds. Exactly 15% of bags weigh less than 13.1 pounds. Find the standard deviation, then find the percent of bags that weigh more than 16 pounds.