Homework 15: Basic Statistics

Mean, Median, Mode, Five-Number Summary, Box Plots, Histograms, and Variance

Name: _____ Section: _____

Instructor: _____ Date: _____

Directions. Show all work clearly. When a data set is not already ordered, rewrite it from least to greatest first. For variance, show the mean, deviations, squared deviations, and final division. Use correct notation and label graphs clearly.

Formula Reference

Mean	$\bar{x} = \dfrac{\text{sum of all data values}}{\text{number of data values}}$
Median	Middle value after the data are ordered. If there are two middle values, average them.
Mode	Value or values that occur most often. A data set may have no mode or more than one mode.
Range	Range = maximum − minimum
Five-number summary	Minimum, Q_1, median, Q_3, maximum
Variance	$\sigma^2 = \dfrac{\sum(x-\bar{x})^2}{n}$ for a full data set

A. Mean, Median, Mode, and Range

1. Find the mean, median, mode, and range.

$$6, 8, 10, 12, 10, 14, 16, 10$$

Mean: _____ Median: _____ Mode: _____ Range: _____

2. Find the mean, median, mode, and range.

$$5, 7, 9, 9, 12, 14, 9, 15, 18$$

Mean: _____ Median: _____ Mode: _____ Range: _____

3. The test scores of eight students are shown below.

$$72, 88, 91, 75, 88, 84, 90, 88$$

Find the mean, median, mode, and range. Briefly explain which measure best represents the typical score.

_____

B. Five-Number Summary and Box Plots

4. Find the five-number summary for the data set.

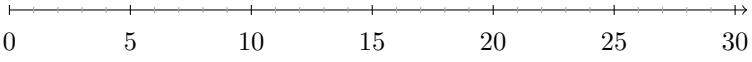
$$3, 5, 7, 9, 11, 14, 17, 20, 24$$

Minimum: _____ Q_1: _____ Median: _____ Q_3: _____

Maximum: _____

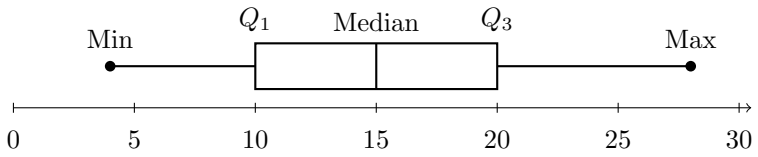
5. Use the five-number summary below to sketch a box plot on the number line.

Minimum $= 2$, $Q_1 = 6$, Median $= 11$, $Q_3 = 16$, Maximum $= 22$



C. Read and Interpret a Box Plot

6. The box plot shows the number of minutes students spent reading last night.



Answer each question.

(a) Minimum: _____

(b) Q_1: _____

(c) Median: _____

(d) Q_3: _____

(e) Maximum: _____

(f) Range: _____

7. What percent of the data are between Q_1 and Q_3? _____

8. What does a longer whisker tell you about that part of the data? _____

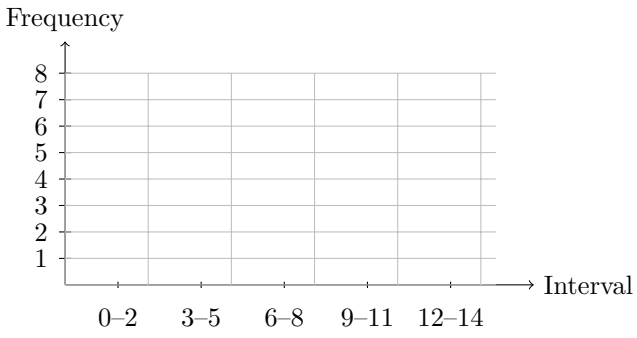
D. Frequency Tables and Histograms

9. The data below represent the number of books read by students during summer vacation.

$$0, 1, 1, 2, 3, 3, 4, 4, 5, 6, 6, 7, 8, 9, 10, 12, 13, 14$$

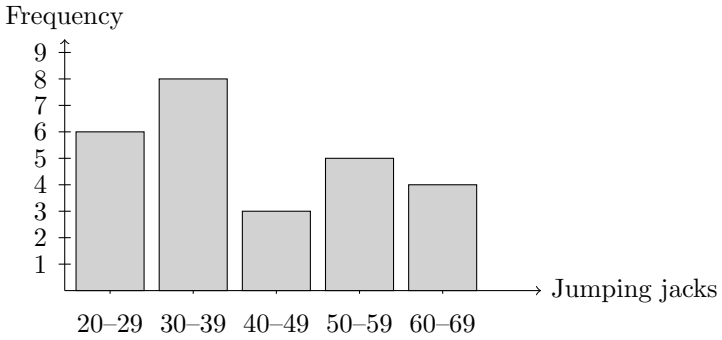
Complete the frequency table using the intervals provided, then draw a histogram.

Interval	Tally	Frequency
0–2		
3–5		
6–8		
9–11		
12–14		



E. Interpret a Histogram

10. The histogram shows how many jumping jacks students completed in one minute.



(a) Which interval has the greatest frequency? _____

(b) How many students completed fewer than 40 jumping jacks? _____

(c) How many students completed at least 50 jumping jacks? _____

(d) How many total students are represented? _____

(e) Can you tell exactly how many students completed 45 jumping jacks? Explain. _____

F. Variance

11. Find the variance of the data set. Use the table to organize your work.

$$4, 6, 8, 10, 12$$

Data value x	Deviation $x - \bar{x}$	Squared deviation $(x - \bar{x})^2$
4		
6		
8		
10		
12		

Mean: _____ Sum of squared deviations: _____ Variance: _____

12. Find the variance of the data set.

$$7, 9, 11, 13, 15$$

Mean: _____ Variance: _____

G. Applications and Mixed Review

13. A coffee shop recorded the number of customers during five weekdays.

$$42, 55, 48, 60, 50$$

Find the mean, median, range, and variance. Then write one sentence explaining what the range means in this context. _____

14. The waiting times, in minutes, at a clinic were recorded below.

$$12, 18, 15, 20, 25, 18, 16$$

Find the mean, median, mode, range, and five-number summary. _____

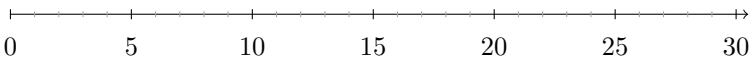
15. A teacher recorded how many homework assignments students completed out of 10.

$$6, 7, 7, 8, 8, 8, 9, 9, 10, 10$$

(a) Find the mean, median, mode, and range.

(b) Create a five-number summary.

(c) Sketch a box plot on the number line below.



16. A small survey asked students how many hours they studied in one week.

$$1, 2, 2, 3, 3, 4, 4, 4, 5, 6, 7, 8$$

Choose appropriate intervals, make a frequency table, and sketch a histogram. Explain why a histogram is useful for grouped numerical data. _____

Final check before submitting: Did you order each data set before finding the median and quartiles? Did you label every graph? Did you show the mean before computing variance?