Midterm Practice Quiz

Question 1 of 6: Statistics and connected graphs

Formula sheet pages 1, 3 and 13. Practice based on the photographed statistics question.

A random sample gives these 13 observations. Use the quartile method in your formula sheet. Write the formulas and substitute your numbers before the final answers.

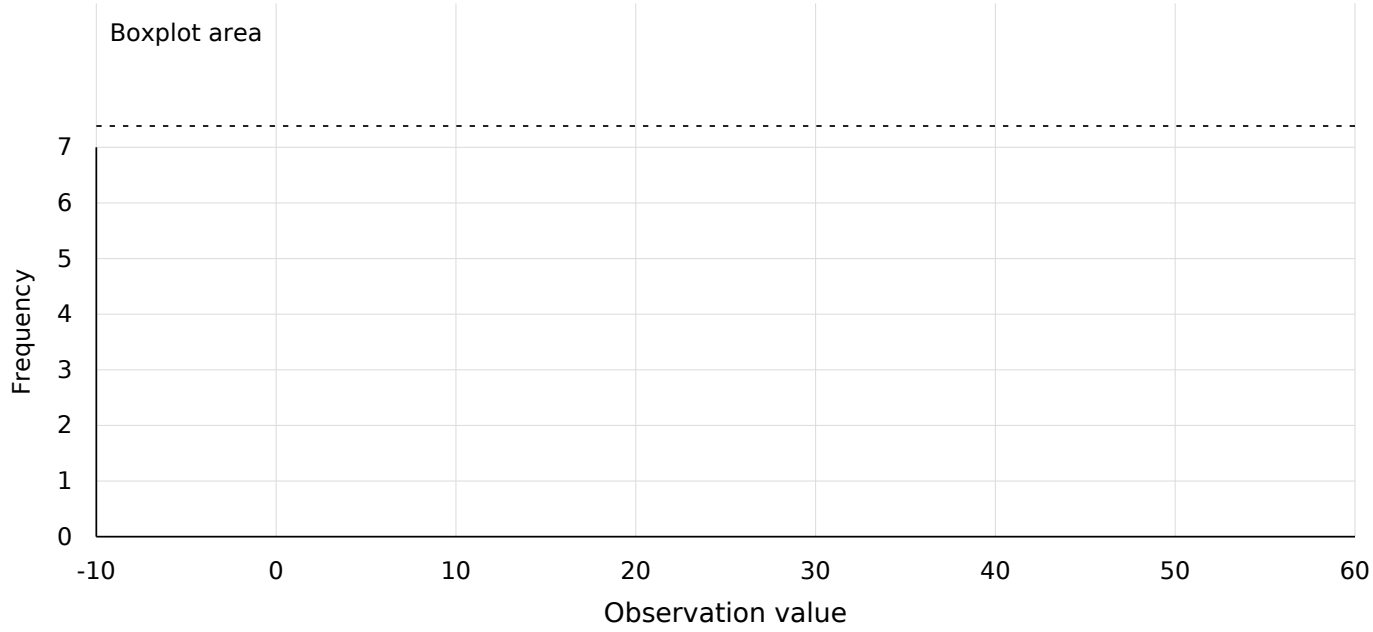
12, 14, 14, 16, 18, 18, 20, 22, 24, 26, 28, 30, 50

a. Find the mean, sample standard deviation (Sx), and five number summary. Round only the mean and sample SD to two decimal places.

Mean	Sample SD	Minimum	Q1	Median	Q3	Maximum

b. Find IQR, both ordinary fences and both extreme fences. Identify any outlier and say whether it is extreme.

c. Draw a boxplot above a histogram on the shared scale below. Use bins 10 to under 20, 20 to under 30, 30 to under 40, 40 to under 50, and 50 to under 60. Mark outliers and ordinary fences.



Describe the shape: _____

Midterm Practice Quiz

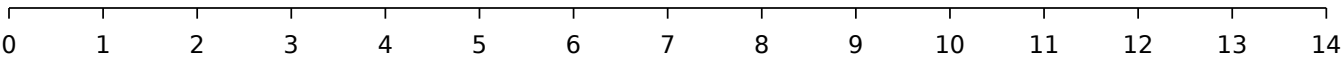
Question 2 of 6: Dot plot and question wording

Formula sheet pages 4 and 7.

The numbers below are counts of books read by 20 students during a term. Keep repeated observations.

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

a. Construct a dot plot with one dot for each student. Label the horizontal axis. State the total number of dots to check your drawing.



Total dots: _____ Axis label: _____

b. Let X mean one student's book count. Rewrite each question using symbols, then give the number of students. Count every observation, including repeats.

Question in words	Write the symbols	Student count
How many read more than 5 books?		
How many read at least 5 books?		
How many read at most 2 books?		
How many read between 2 and 6 books, including 2 but excluding 6?		

c. Describe the overall shape of the dot plot.

Midterm Practice Quiz

Question 3 of 6: Two way table probability

Formula sheet pages 5 and 6.

A survey of 300 people asks whether crime is increasing, staying the same, decreasing, or whether they are not sure. One person gave exactly one response.

Gender	Increasing	Same	Decreasing	Not sure	Total
Male	60	____	25	15	180
Female	30	50	____	15	____
Total	____	130	50	30	300

a. Complete the four missing entries in the table.

For b through f, write a formula or fraction before the decimal. Round probabilities to four decimal places. OR includes anyone in either group or both.

b. What is the probability a respondent was not sure?

c. What is the probability a respondent is male AND says same?

d. What is the probability a respondent is female OR says increasing?

e. What is P(increasing GIVEN female)? Circle the whole given group and label it e. State the denominator you use.

f. What is P(female GIVEN increasing)? Circle the whole given group and label it f. State the denominator you use.

g. Are Female and Increasing independent? Compare exact fractions for the same Increasing event with and without GIVEN female, then explain.

Midterm Practice Quiz

Question 4 of 6: Frequency table and histogram

Formula sheet pages 8, 9 and 13.

These whole number observations are grouped into the exact classes shown. The frequency f is the number of observations in each class.

Class	Frequency f	Midpoint x	Boundaries	x × f	Percent
20 to 29	3				
30 to 39	6				
40 to 49	8				
50 to 59	5				
60 to 69	2				
Total		Not used	Not used		

a. Complete the midpoint, boundary, product and percent columns. Find total frequency, total x × f and total percent. Round individual percents to two decimal places.

b. Find the estimated mean using the class midpoints and frequencies. Show the formula, your substituted numbers and the answer to two decimal places.

c. Draw a histogram with touching bars. Label both axes and each class boundary. If you use the Evo, choose settings for this table’s classes.

Calculator settings: Xmin ____ Xmax ____ Xscl ____ Ymax ____



Midterm Practice Quiz

Question 5 of 6: Sampling methods and bias

Formula sheet pages 10. No calculator is needed for this question.

A college wants opinions from all its students about campus services. Each scenario below describes a separate survey plan.

a. Identify the sampling method for each scenario. Use a method from your formula sheet.

Survey plan	Sampling method
A. Randomly select 20 students from each year level.	
B. At the main entrance on Monday morning, randomly choose one of the first 15 arrivals. Then ask every 15th arriving student.	
C. Randomly select four classrooms and ask every student in those classrooms.	
D. Ask students who are eating in the cafeteria at noon.	
E. Leave surveys around the school. Students decide whether to return one to the office.	

b. Choose plan B, D or E. Identify one possible bias. Explain which students may be missed or overrepresented.

c. Improve the plan you chose so students across the college have a fairer chance of being selected. Describe an actual selection method.

Midterm Practice Quiz

Question 6 of 6: Sampling distribution of a mean

Formula sheet pages 11, 12 and 13. Additional practice from the sampling distribution section you asked to include.

A population of measurements is normally distributed with mean **μ = 100** and known population standard deviation **σ = 20**. A random sample contains **n = 25** independent observations. Let $\bar{x}$ be the sample average.

For each probability, write the symbols and record the normalcdf lower bound, upper bound, mean and standard error before the result. Round probabilities to four decimal places and percents to two decimal places.

a. Find the mean of the sample averages and the standard error. Show the formula and substitute the given numbers.

b. What is the probability that the sample average is more than 106?

c. What is the probability that the sample average is between 96 and 106? Give both a decimal and a percent.

d. What is the probability that the sample average is at most 96?