UNIVERSITY AT ALBANY
STATE UNIVERSITY OF NEW YORK

AMAT 108 Elementary Statistics
Fall 2025

Exam 1
Version 1

Print Name:	
UAlbany Email:	

Directions: You have **80 minutes** to answer the following questions. ***No notes, textbooks, mobile phones or other aids are allowed. Only scientific calculators are allowed.*** For all multiple-choice questions, select **one** answer from among the choices given. No explanation is required to be shown and no partial credit will be given. Make sure to **completely** fill in the circle corresponding to your chosen answer. For all free-response questions, you **must** show all necessary work to receive full credit. An answer with no work, even if correct, will not receive full credit. Please circle or box your final answer.

Do not detach any pages. Please choose your section with a check mark (✓) in the left-most column.

✓	Section	Instructor Name	Meeting Time	Meeting Days	Meeting Location
	4863	John Habib	12:00PM	T/TH	SS 116
	4465	Tung Lam	8:00AM	M/W	SS 116
	4713		9:00AM	T/TH	LC 3B
	3749	James Lamatina	10:30AM	T/TH	SS 116
	1710	Chris Lange	3:00PM	T/TH	SS 116
	3370		4:30PM		
	5435	Doug Rosenberg	3:00PM	T/TH	TA 118
	3750	Sam Spellman	9:00AM	T/TH	SS 116
	3748	Alea Wittig	11:40AM	M/W	SS 116

Exam Scoring:

Page	Possible Points	Points Earned
3	5	
4	7	
5	7	
6	3	
7	9	
8	8	
9	16	
Total Points	55	
Percentage		

1. Which of the following options most obviously contains bias in sampling? (2 pts.)

   ① An engineer selects the first 50 iPhones sold at a random Apple Store to study the lifespan of their batteries.

   ② A customer service representative randomly selected individuals to phone for a survey. Everyone selected picked up the phone and provided a response.

   ③ Both of the previous options have obvious bias in sampling.

   ④ None of the previous options have bias in sampling.

2. Data is collected on Americans' preferences for learning about local and national news. The data is collected by asking everyone in randomly selected US states and territories. Which sampling method was used? (2 pts.)

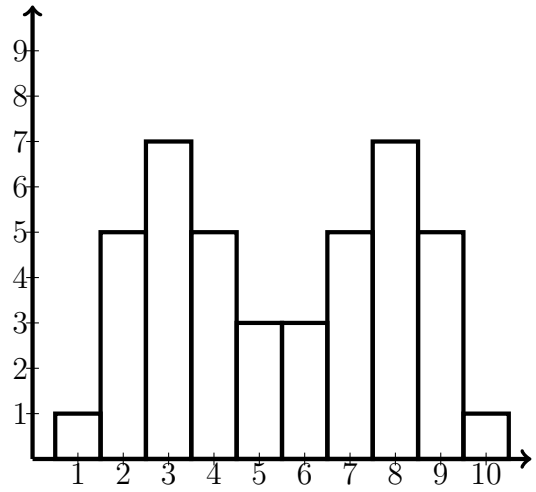
   ① Cluster sampling

   ② Simple random sampling

   ③ Stratified random sampling

   ④ None of the previous options.

3. A data analyst is interested in analyzing the amount of time (in days) that it takes instructors to grade AMAT 108 exams. The histogram below is of the data he collects from 2023-2025.



   Which of the following describes the shape of the histogram? (1 pt.)

   ① Unimodal and positively skewed (skewed to the right)

   ② Unimodal and symmetric

   ③ Bimodal and symmetric

   ④ Unimodal and negatively skewed (skewed to the left)

   ⑤ None of the previous options.

Questions 4 and 5 are based on the following: Suppose A and B are events with $P(A) = 0.63$, $P(B) = 0.21$, and $P(A \cap B) = 0.14$.

4. Find $P(A|B)$. (2 pts.)

① 0.63
② 0.67
③ 0.22
④ 1.49
⑤ 4.55

5. Find $P(A^C)$. (1 pt.)

① 0.37
② 0.63
③ 0.13
④ 0.21
⑤ 0.79

6. Suppose E and F are mutually exclusive (disjoint) events with $P(E) = 0.71$ and $P(F) = 0.13$. Find $P(E \cup F)$. (2 pts.)

① 0.09
② 0.16
③ 0.71
④ 0.58
⑤ 0.84

7. Two fair coins are flipped and a standard six-sided die is rolled. The probability that both coins land heads facing upwards and an even number is rolled equals which of the following? (2 pts.)

① 0.71
② 1.5
③ 0.25
④ 0.125
⑤ None of the previous options.

Questions 8-11 are based on the following. A researcher is recording information from a survey of randomly selected students taking Calculus 1 at UAlbany. Choose the option that describes each variable.

8. Satisfaction rating (on a scale from $0, 1, 2, \ldots, 10$) of the instructor of record (1 pt.)

   ① Continuous Numerical/Quantitative ② Categorical/Qualitative

   ③ Discrete Numerical/Quantitative ④ None of the previous options.

9. Amount of time (in minutes) spent on Homework 4 (1 pt.)

   ① Continuous Numerical/Quantitative ② Categorical/Qualitative

   ③ Discrete Numerical/Quantitative ④ None of the previous options.

10. Raw score (number of points earned) on Exam 2 (1 pt.)

    ① Continuous Numerical/Quantitative ② Categorical/Qualitative

    ③ Discrete Numerical/Quantitative ④ None of the previous options.

11. Most recent mathematics course taken (i.e. geometry, trigonometry, precalculus) (1 pt.)

    ① Continuous Numerical/Quantitative ② Categorical/Qualitative

    ③ Discrete Numerical/Quantitative ④ None of the previous options.

12. If the probability of someone being seen as "family" by a child is 0.75, and the probability of both being seen as "family" and receiving at least two pictures weekly from the child's caregivers is 0.6, find the probability of receiving at least two pictures weekly given the person is seen as "family". (3 pts.)

Questions 13-15 are based on the following. An undergraduate admissions office randomly surveys 192 high school seniors. From the survey, they find that 144 of them take at least one Advanced Placement course.

13. Based on the survey, find the relative frequency of high school seniors taking at least one Advanced Placement course. (1 pt.)

    ① 1.33
    ② 0.75
    ③ 0.25
    ④ 4.00
    ⑤ None of the previous options.

14. What is the sample of the survey? (1 pt.)

    ① All high school students.
    ② All high school seniors.
    ③ All students taking AP Physics.
    ④ The 192 high school seniors.
    ⑤ None of the previous options.

15. What is the population of interest? (1 pt.)

    ① All high school students.
    ② All high school seniors.
    ③ All students taking AP Physics.
    ④ The 192 high school seniors.
    ⑤ None of the previous options.

16. A student is completing a project on computer performance. They randomly select several computers and record how long (in seconds) it takes each one to execute a specific piece of code. The observations are below:

    24 61 37 43 18 52 10

    (a) The data set has how many observations? (1 pt.)

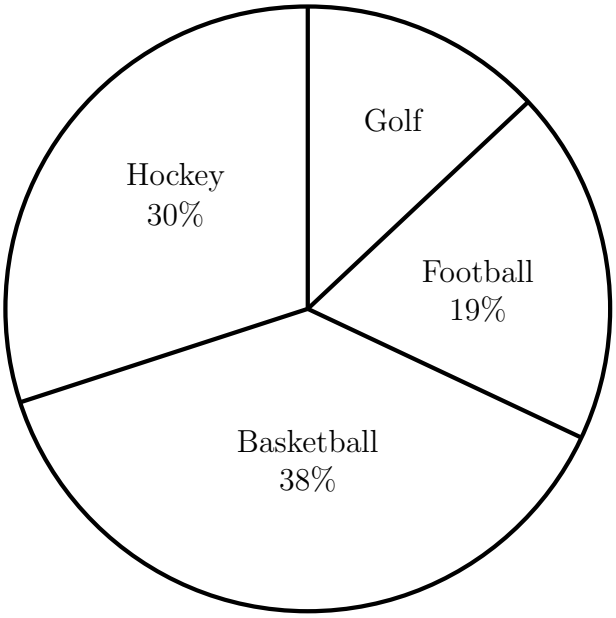
    ① 24
    ② 245
    ③ 9
    ④ 7
    ⑤ None of the previous options.

    (b) Compute the sample mean. (3 pts.)

    (c) Compute the sample standard deviation. Round your answer to *one* decimal place. (5 pts.)

17. Assume that the distribution of the lifespan (in days) of a certain brand of ballpoint pen is roughly unimodal and symmetric (a normal curve) with mean 12.84 and standard deviation 1.08. What interval of lifespans of these ballpoint pens represents the central 95% of all lifespans? (4 pts.)

18. An individual is looking for a new sporting event to watch at night. Looking online, they find the results of a survey of 15386 people organized in the pie chart below.



(a) What is the percentage of those who said golf is their favorite sporting event to watch? (2 pts.)

(b) How many of the surveyed individuals said their favorite sporting event to watch is basketball? Round your answer to the nearest whole number, where needed. (2 pts.)

19. A professor is studying the amount of time (in minutes) it takes them to commute to work each day. Below is a sample of their commute times from the 2024-25 academic year.

18 16 22 42 15 13 11 10 15 19 21

(a) Sort the observations from least to greatest. (1 pt.)

(b) Fill in the table below. (5 pts.)

Minimum	Lower Quartile	Median	Upper Quartile	Maximum

(c) Find the IQR of the data set. (2 pts.)

(d) Does the data set contain any outliers? If so, state *all* outliers. (4 pts.)

(e) Construct a stem-and-leaf plot for the data set. *Indicate a key for the plot.* (4 pts.)

Stem	Leaf

Formula Sheet:

- Relative frequency:

$$\text{relative frequency} = \frac{\text{frequency}}{\text{sample size}}$$

- Sample mean:

$$\overline{x} = \frac{x_1 + x_2 + \cdots + x_n}{n}$$

- Sample standard deviation:

$$s = \sqrt{\frac{(x_1 - \overline{x})^2 + (x_2 - \overline{x})^2 + \cdots + (x_n - \overline{x})^2}{n-1}}$$

- IQR:

$$IQR = UQ - LQ = \text{Upper Quartile} - \text{Lower Quartile} = Q_3 - Q_1$$

- The fence equations to help in finding any mild outliers:

$$\text{Lower Fence} = LF = LQ - (1.5 \cdot IQR)$$
$$\text{Upper Fence} = UF = UQ + (1.5 \cdot IQR)$$

- Probability:

$$P(A \cup B) = P(A \text{ or } B) = P(A) + P(B) \text{ if events } A \text{ and } B \text{ are disjoint}$$
$$P(A \cap B) = P(A \text{ and } B) = P(A)P(B) \text{ if events } A \text{ and } B \text{ are independent}$$

- Conditional probability:

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

- Complement probability (probability complement rule): $P(A^C) = P(\text{not } A) = 1 - P(A)$

- At least 1 Rule: $P(\text{at least 1 success in } n \text{ trials}) = 1 - P(\text{no successes in } n \text{ trials})$