

MTH 23.5, Fall 2024

Take home exam

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Directions:

Due: Monday, October 7.

Directions: Write your answers in your own paper and give them to me at the beginning of class. To get full credit you must **show your work**. Make sure to clearly write your name in every page of your submission and to clearly indicate your answers. Please, **STAPLE ALL THE SHEETS OF YOUR SUBMISSION TOGETHER**.

NO LATE SUBMISSIONS WILL BE ACCEPTED.

1. For the following data:

11, 29, 30, 41, 46, 46, 46, 47, 49, 52, 54, 54, 59, 60, 60.

- Find the mode.
 - Find the median.
 - Find the first and third quartiles.
 - What is the percentile rank of 46?
2. A survey found that 60% of all the regular customers in an ice cream shop like vanilla ice cream, and 70% like chocolate. Of those who like chocolate, 50% also like vanilla. If you walk into that store and encounter one of the regular customers what is the probability that
- They like both chocolate and vanilla.
 - They like at least one of the flavors, chocolate or vanilla.
3. In a stack of shelves I have 400 books. They are either in English or in Greek, and their content is either Math, Non Fiction other than math, or Fiction. The number of the books according to their language and their category is shown in the table below

	Math	Non-Fiction	Fiction	Total
English	150	80	20	
Greek	50	40	60	
Total				

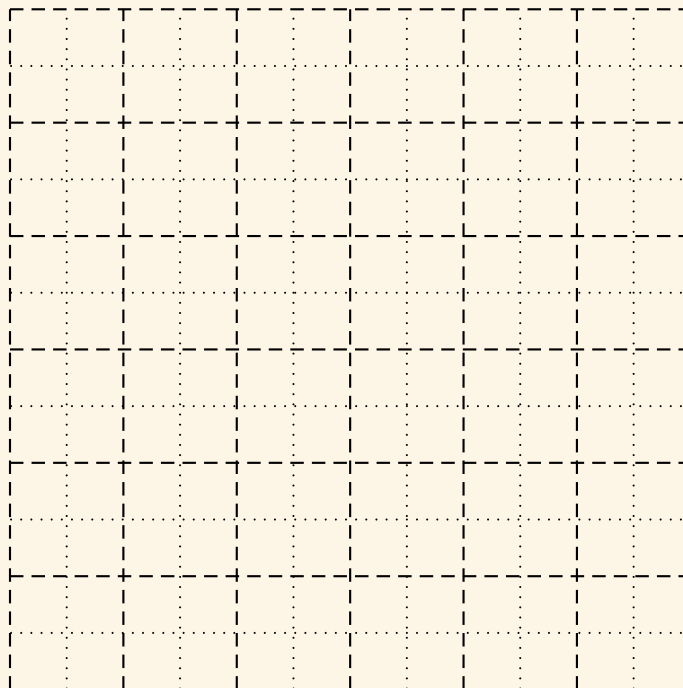
If I pick up a book at random from that stack of shelves what is the probability that the book is

- A Greek book.
- A Greek book **given** that it is a Math book?
- A Greek book **or** a Math book?
- Not** a Math book?

4. A box contains balls numbered 1 through 5 with relative frequencies as shown in the table below.

x	1	2	3	4	5
p	0.10	0.25	0.05	0.35	0.25

(a) Construct the relative frequency histogram in the grid below.



(b) A ball is drawn randomly from that box. What is the probability that its number is even?

(c) A ball is randomly drawn from the box and its number is odd. What's the probability that its number is 1?

5. Find the mean and the standard deviation of the following sample data:

0 2 3 5.

6. The GPAs of all currently registered students at a large university have a bell-shaped distribution with mean 2.7 and standard deviation 0.6. Students with a GPA below 1.5 are placed on academic probation. Approximately what percentage of currently registered students at the university are on academic probation?

7. Alice and Bob took the same Statistics course in different semesters with different final exams. Alice's score on the final exam was 85, and on that exam the mean was 80 and the standard deviation 5. Bob's score on the final exam that he took was 84, and on that exam the mean was 74 and the standard deviation 8.

(a) Who did relatively better, Alice or Bob?

(b) What score in Alice's version of the exam, does Bob's score correspond to?

8. An animal shelter has a 65% adoption rate for kittens. Of all kittens in the shelter, 80% live to be 8 years or older. Of the kittens who are adopted, 90% live to be 8 years or older.

(a) What is the probability that a randomly selected kitten in the shelter will get adopted **and** live 8 or more years?

(b) What is the probability that a randomly selected kitten in the shelter will get adopted **or** live 8 or more years?