

Midterm I: Some problems for review

The exam will be taken in class (SCB 300/301) on Wednesday 2/11. You need to bring your laptop and pocket calculator (of any kind). You are not allowed to use any app on your laptop, even a calculator app. Your web browser should occupy the full screen at all time. Phones and notecard are not allowed. The instructor will provide scratched papers for you. When you are seated, go to Canvas and click on link for Midterm I on the home page. You will be directed to MyLab Math, which will ask you for an access code. The instructor will give you the access code.

Other exam policies:

The proctor may reassign your seat at the beginning or at any time during the exam.

Your laptop screen must be bright enough for the proctor to see your on-screen activities without difficulties.

Using a phone or any unauthorized assistance while the exam is in progress, whether inside or outside of the classroom, is prohibited.

If you need to leave the room for any reason, you must first obtain the proctor's permission. If the proctor is not present in the room and you want to leave, you must wait until he/she comes back. If you finish your exam, you must notify the proctor immediately. He/she will then ask you to log out of the exam and close your browser.

Violation of any of the above policies is considered as cheating and may result in a score of zero.

The textbook sections to be covered are 3A, 3B, 3C, 7A, 7B, 7C, 7E. You should review the homework problems, worksheets, quizzes, examples given in the lectures. It is always a good idea to study for the exam with someone.

The most important formulae, which you need to understand and memorize, are:

- *Expected value:*

$$E(X) = v_1 \cdot P(X = v_1) + v_2 \cdot P(X = v_2) + \cdots + v_n \cdot P(X = v_n)$$

where v_1, v_2, \dots, v_n are all possible values of random variable X .

- *Counting methods:*

| The number of groups of r items selected from n items | Repetition allowed | No repetition |
|--|---------------------|-----------------------|
| Order matters | n^r | $\frac{n!}{(n-r)!}$ |
| Order doesn't matter | No need to memorize | $\frac{n!}{(n-r)!r!}$ |

Some problems to practice:

- 1) How many different telephone numbers of the form $aaa-bbb-cccc$ can be formed if the area code aaa can only begin with the numbers 2 through 7 and the exchange bbb cannot begin with 0?
- 2) You are dealt 2 cards from a standard deck of 52 card. Find the probability of being dealt a Jack and a Queen (order doesn't matter).
- 3) You toss a coin 10 times.
 - a) How many possible outcomes are there?
 - b) How many outcomes in which you get *exactly* 4 heads?
 - c) What is the probability of getting *exactly* 4 heads?
 - d) What is the probability of getting *at least* 4 heads?
- 4) The price of a ticket is \$1 and there is a 1 in 10 probability of winning \$1, a 1 in 50 probability of winning \$5, a 1 in 500 probability of winning \$100, and a 1 in 1 million probability of winning \$100,000. Find the expected value (to you) of a single ticket. Find the average winnings or loss expected if you purchase 1000 tickets.
- 5) From 08/2021 to 08/2023, the unemployment rate in the US rose by 0.3 percentage point to 3.8 percent. What was the unemployment rate in 08/2021?
- 6) From 2010 to 2018, the 4-graduation rate of University of Hawaii-Manoa has risen by 101.1% to 35.2%. What was the 4-graduation rate in 2010?
- 7) Round the following numbers to the nearest hundred, ten, tenth, and hundredth.
 - a) 1562.1651
 - b) -265.1515
- 8) If the true length of a table is 123 centimeters but the measurement tells 121 centimeters. What is the absolute error? What is the relative error (percentage)?
- 9) Round the fraction $45/1241$
 - a) to 4 decimal places
 - b) using 4 significant digits