

Math 141H Exam 3 Review Questions

- A survey of 100 students found that 40 like rock music, 55 like country music and 5 students like both.
 - What is the probability that a student who likes country music likes rock music?
 - Are the events “likes country music” and “likes rock music” mutually exclusive? Independent?
- A bookshelf has 22 books on it. There are 7 are hardback books and 15 paperback books. There are 5 reference books (all hardbacks), 10 fiction books (all paperbacks) and 7 non-fiction books. What is the probability that a non-fiction book is a paperback?
- There is a 20% chance your mail comes before noon on Monday and a 30% chance that your mail comes before noon on Tuesday. If these events are independent, what is the probability your mail comes before noon on exactly one of these two days?
- There are 72 marbles in a box. There are 18 different colors and 4 marbles of each color. Five marbles are chosen at random from the box. What is the probability of a full house? That is, 3 of one color and 2 of a different color.
- Two fair six-sided dice are rolled. One is red and one is green.
Let E denote the event that the green die shows a 3.
Let F denote the event that the red die shows a 4.
Let G denote the event that the sum of the numbers is 10.
Let H denote the event that the numbers shown are the same.
 - Are events E and F independent?
 - Are events F and G independent?
 - Are events E and G mutually exclusive?
 - Find $P(G|E)$
 - Find $P(G|H)$
- A shipment of 14 video games contains exactly 3 defective games. A sample of 4 is chosen at random for testing. What is the probability that no defective games are chosen?
- A student studying for a spelling test knows how to spell 15 of the 20 words on the list. The teacher chooses 10 questions at random from the list. What is the probability that the student knows at least 9 of the words on the test?
- A bag has 10 oranges, 2 of which are rotten. A sample of 3 is chosen. What is the expected number of rotten oranges in the sample?
- A 4-digit pin code is generated randomly. What is the probability that the last digit is a 7 or the first digit is a 6?
- A group of 120 students go to Spain for study abroad. Eighty of the students go to Seville and the rest go to Madrid. Sixty percent of the students in Seville take a class in Spanish history and the rest take a class in Spanish Literature. In Madrid, half of the students take a class in Spanish history and half take a class in Spanish Literature. What is the probability that a student in a Spanish Literature class is in Seville?
- A buyer is considering a lot of 60 collectible cards and the seller will only let her check 4 cards to see if she wishes to purchase the lot. If the buyer finds any bent cards in her sample, she will not purchase the lot. What is the probability that the buyer ends up purchasing the cards given that there are 20 bent cards in the lot?
- A class of 100 students is given a 10-point quiz with the following results:

Number of points	0	1	2	3	4	5	6	7	8	9	10
Number of students	2	8	5	10	2	10	7	30	8	10	8

Find the mean, median, mode, and standard deviation.

- 13.** A data distribution has a mean of 10 and a standard deviation of 1.1. Use Chebychev's theorem to answer the questions below.
- What is the probability that a value is between 7 and 13?
 - Find a value of c such that 84% of the data is in the range $10-c$ to $10+c$
- 14.** A tree farm plants 500 trees. A tree has an 85% chance of surviving one year. Use the normal curve approximation to the binomial distribution to estimate the probability that
- more than 430 trees survive one year.
 - fewer than 410 trees survive one year.
 - between 420 and 425 trees survive one year.
- 15.** The length of a stick pretzel is normally distributed with a mean length of 6 cm and a standard deviation of 0.4 cm.
- What is the probability that a pretzel is longer than 6.3 cm?
 - What is the probability that a pretzel is between 5 and 6 cm long?
 - What lengths bracket the middle 50% of pretzels?
- 16.** A bag contains two one-dollar bills, a five-dollar bill and a ten-dollar bill. A player draws bills one at a time without replacement until a ten-dollar bill is drawn. Then the game stops and the money is kept by the player.
- What is the probability of winning \$16?
 - What is the probability of winning all the money in the bag?
 - What is the probability of the game ending after two draws.
- 17.** The probability that an event E occurs is 55%. What are the odds in favor of event E? If the odds of an event F occurring are 6:11, what is the probability of event F?
- 18.** A class has 150 students and the maximum grade possible in this class is 100. Eleven students had a grade of 90 or more. Forty-one students had grades of 80 or more. Fifty-seven students had a grade that was greater than or equal to 60 but less than 70. Ten students had grades less than 60. Organize this information in a probability distribution table.
- 19.** The probability that a transistor is defective is 1%. A box contains 500 transistors. What is the probability that a box contains
- zero defective transistors?
 - at most 4 defective transistors?
 - at least 7 defective transistors?
 - between 3 and 8 defective transistors?
 - If you have two boxes of defective transistors, what is the probability they both have exactly 5 defective transistors?
 - What is the expected number of defective transistor? What is the standard deviation in the number of transistors?
- 20.** The average number of cars passing through a certain toll booth is 15 per hour. Use the Poisson distribution to find the probability that during a given 5-minute period
- no cars go through the toll booth,
 - exactly 1 goes through
 - more than two go through.