Chapter 7: Practice Exam

1. A group of 215 citizens were surveyed about their approval of the healthcare reform and the finance reform. It was found that 91 citizens were for the healthcare reform and 116 were for the finance reform. In the survey 24 citizens announced that they did not approve of either reform and prefer to leave things as they are. Estimate the probability that: (i) a random citizen approves at least one of the two reforms. (ii) a random citizen approves both the reforms. (iii) a random citizen approves the healthcare reform but not the finance reform.

2. An experimenter has an eight sided die with numbers 1 through 8 marked on its eight sides. He casts the die and records the number on the base of the die. Thus, his sample space has 8 samples points corresponding to the eight markings. Let A be the event that the number on top is bigger than or equal to 4. Let B be the event that the number on top is less than or equal to 5. It is observed by experimentation that P(A) = 54% and P(B) = 50%. (i) What is the probability that the number on bottom is 4 or 5? (ii) What is the probability that the number on bottom is 1 or 2 or 3? (iii) The experimenter concludes that this die must be loaded since a fair die would have the numbers 4, 5 on the bottom with probability equal to:

3(a) There are 40 different versions of an online homework. If a group of 5 classmates decide to work together, what is the probability that at least two of them receive the same version? (b) Computer processors are shipped in lots of 80 from a factory. Before being shipped, 15 are randomly tested from each lot. If any of these 15 fail, then the entire lot is not shipped. What is the probability that a lot containing exactly 2 bad processors gets shipped?

4. A survey of home owners found that 44% own less than 2 cars, 58% own less than 3 cars, and 10% own 4 or more cars. (a) What is the probability that a randomly chosen home-owner owns 2 or 3 cars? (b) What is the probability that a randomly chosen home-owner owns exactly 2 cars?

5. Figures obtained from a city's police department seem to indicate that, of all motor vehicles reported as stolen, 64% were stolen by professionals whereas 36% were stolen by amateurs (primarily for joy rides). Of those vehicles presumed stolen by professionals, 24% were recovered within 48 hours, 16% were recovered after 48 hours, and 60% were never recovered. Of those vehicles presumed stolen by amateurs, 38% were recovered within 48 hours, 58% were recovered after 48 hours, and 4% were never recovered. (a) What is the probability that a vehicle stolen by a professional in that city will be recovered within 48 hours? (b) What is the probability that a vehicle stolen in that city will never be recovered?

More Chapter 7 practice

These problems also seem reasonable for the exam, and are based on the homework.

6. Due to the economic downturn, a local factory is being forced to lay off its work force. 85 out of 340 managers will be laid off. A total of 230 out of 940 employees will be laid off, including the managers. The company is worried there might be significant bias in the lay offs. (a) What is the probability that an employee will be laid off? (b) What is the probability that a manager will be laid off? (c) What is the probability that an employee that is not a manager will be laid off? (d) Are the events "an employee selected at random is a manager" and "an employee selected at random is being laid off" independent?

7. Suppose you are dealt a hand of 3 cards from a deck of 32 cards consisting of 4 aces, 4 twos, 4 threes, and so on, up to 4 eights, from each of the suits hearts, diamonds, clubs, and spades. (a) What is the probability that your hand will have at least 2 hearts? (b) What is the probability that your hand will have at least 2 cards of the same suit? (c) What is the probability that your hand will have at least 2 sixes? (d) What is the probability that your hand will have a pair, that is, two cards of the same numerical value or two aces?

8. (a) How many ways can 6 out of 12 knights be seated at a round table? (b) How many ways can the remaining knights be arranged at a second round table? (c) Lancelot and Arthur do not get along. If all seats were chosen randomly, what would be the probability that Lancelot and Arthur would sit at the same table? (d) What would be the probability that they would sit next to each other?

9. (a) How many ways can the letters of the word NATURE be arranged? (b) How many ways can the letters of the word SCIENCE be arranged? (c) How many ways can the letters of the word AARDVARK be arranged? (d) How many ways can the letters of the word EYE be arranged? For (d), list them all.

10. (a) A florist has access to 10 types of flowers and 11 types of foliage. How many types of bouquets can he make using 3 types of flowers and 2 types of foliage? (b) A teacher is choosing student representatives ... (c) A baseball team line up ... (d) A jury is selected ....