

MAT209 EXAM III

MAT 209 · SPRING 2009

You must show all work to get full credit.

Problem 1. (25 points) The town has an emergency repair job, for which it can use one of two small firms, whose operations and availabilities are independent of each other. Firm I has said it is available on short notice 60% of the time, while firm II says it is available on short notice 80% of the time. Find the probability that:

- (a) both firms are available;
- (b) neither firm is available;
- (c) only one of the firms is available (hint: draw a Venn diagram with circles for I and II).

Problem 2. (25 points) Answer parts a) and b) below based on the following information: Blood types O , A , B and AB occur in the population with frequencies 0.43, 0.41, 0.11, and 0.05 respectively. A person may receive blood from another person with the same Rh factor and with the same type or type O . Within all the blood types, the Rh factors, (plus and minus), occur with frequencies 0.86 and 0.14 respectively.

- (a) To two decimal places, what is the probability that a randomly selected individual has type B, Rh-?
- (b) A hospital needs two units of blood to give to a type A, Rh+ recipient. An individual can donate only one unit. If 10 people arrive at the blood donation center, what is the probability that the hospital will be able to obtain the blood that it needs? Be careful to consider all possibilities that will satisfy the hospitals needs. Show details of the calculation using appropriate probability formulas.

Problem 3. (25 points) According to the Straphanger's Campaign, New York City subway trains were on time during rush hour 70% of the time. During rush, 8:00-10:00 AM and 4:00-6:00 PM, there are fifteen #2 trains per hour. The table below gives the rush hour performance of the #2 line.

TABLE 1

Time	Number late
8 : 00 – 9 : 00 AM	2
9 : 00 – 10 : 00 AM	5
4 : 00 – 5 : 00 PM	4
5 : 00 – 6 : 00 PM	4

Date: May 14, 2009.

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- (a) Using this table estimate the probability that a #2 rush hour train will be on time?
- (b) What is the probability that an arbitrary rush hour train (not necessarily on the #2 line) will be late?
- (c) If you are traveling on a rush hour train, are the events Being on a #2 train and Being on time independent?

Problem 4. (25 points) A bowl contains 6 red balls, 4 blue balls and 3 white balls. You pick two balls without replacement.

- (a) What is the probability that both balls are white? (Answer may be left as a fraction or as a three-place decimal.)
- (b) What is the probability that both balls are the same color? (Answer may be left as a fraction or as a three-place decimal.)
- (c) What is the probability that both balls have different colors? (Answer may be left as a fraction or as a three-place decimal.)