MATH 210, Discussion 325 Quiz 4 February 25, 2008

Name:

Problem 1 (5 points): *A TA is teaching two sections of a math class. Section 1 has six students and section 2 has five students. Two of the section 1 students forgot to staple their homework and three of the section 2 students forgot to staple their homework. The TA chooses a homework at random and notes that it is unstapled. What is the probability that a student from section 1 submitted it?*

Solution:

$$\Pr[\textit{section } 1 | \textit{unstapled}] = \frac{\Pr[\textit{section } 1 \cap \textit{unstapled}]}{\Pr[\textit{unstapled}]} = \frac{\frac{2}{11}}{\frac{5}{11}} = \frac{2}{5}.$$

Problem 2 (5 points): *There are 3 green balls and 5 blue balls in a jar. A ball is selected at random, its color is noted, and it is replaced. The selection is repeated twice more. Find the probability that at least 2 blue balls are selected.*

Solution: We must add the probability of choosing 2 blue balls to the probability of choosing 3 blue balls. Using the formula for Bernoulli trials, the answer is:

$$C(3,2)\Big(\frac{5}{8}\Big)^2\Big(\frac{3}{8}\Big)^1 + C(3,3)\Big(\frac{5}{8}\Big)^3\Big(\frac{1}{8}\Big)^0 = 3\Big(\frac{5^2 \cdot 3}{8^3}\Big) + 1\Big(\frac{5^3}{8^3}\Big) = \frac{225+125}{512} = \frac{350}{512}.$$

Problem 3 (5 points): *There are 8 balls in a bag: 4 yellow, 2 red, and 2 green. I select two at random: one after the other without replacement. What is the probability that the second is green?*

Solution: Drawing a tree diagram, and adding the probabilities of drawing yellow then green, red then green, and green then green gives:

$$\frac{4}{8}\cdot\frac{2}{7} + \frac{2}{8}\cdot\frac{2}{7} + \frac{2}{8}\cdot\frac{1}{7} = \frac{8}{56} + \frac{4}{56} + \frac{2}{56} = \frac{14}{56} = \frac{1}{4}.$$