Stat 50 – Worksheet #4: Conditional Probability and Independence

1. A study is conducted to determine if there is a relationship between workplace injury and job category at a company. Data for employees on whether they were injured or not last year and their job category are shown below.

	Clerical (C)	Technical (T)	Managerial (M)
injured (I)	4	8	1
not injured	26	53	15
total	30	61	16

   (a) If the employee was technical, what is the probability they were injured?

   (b) If the employee was injured, what is the probability they were clerical?

   (c) If the employee was managerial, what is the probability they were not injured?

   (d) If the employee was not managerial, what is the probability they were not injured?

   (e) What is the probability the employee was injured or clerical?

2. Suppose that at a certain university 25% of students are engineering majors. Also, 8% of all students are sophomore engineering majors. Given a randomly selected student is an engineering major, what is the probability he/she is a sophomore?

3. A farmer plants an apple tree and a peach tree in his orchard. The probability the apple tree survives is 0.8 while the peach tree has a 0.7 probability of survival. Assuming the trees survive independently, what is the probability that

   (a) both trees survive

   (b) at least one of the trees survives

   (c) exactly one of the trees survives

   (d) Given that exactly one tree survived, what is the probability it was the peach tree?

4. A fair six-sided die is rolled. Let the event A = an even is rolled and B = a number over 3 is rolled.

   (a) Calculate $P(A)$ and $P(A|B)$

   (b) Is $P(A) = P(A|B)$?

   (c) Based on your answer to the last part, can you conclude A and B are independent events? Explain.