

STAT 575  
Homework 1 Problems  
due Friday January 27

5 Multiple Choice Problems to be graded. Please see Course Documents Folder on Blackboard for Selecting Multiple Choice Answers

1. The profit for a new product is given by  $Z = 3X - Y - 5$ .  $X$  and  $Y$  are independent random variables with  $Var(X) = 1$  and  $Var(Y) = 2$ . What is the variance of  $Z$ ?
2. A blood test indicates the presence of a particular disease 95% of the time when the disease is actually present. The same test indicates the presence of the disease 0.5% of the time when the disease is not present. One percent of the population actually has the disease. Calculate the probability that a person has the disease given that the test indicates the presence of the disease.
3. Suppose the number of hurricanes in a 20-year period follow a Binomial distribution with  $n = 20$  and probability  $p = 0.05$ . Using this assumption, calculate the probability that there are fewer than 3 hurricanes in a 20-year period.
4. An actuary has discovered that policy holders are three times as likely to file two claims as to file four claims. If the number of claims filed has a Poisson distribution, what is the variance of the number of claims filed?
5. Let  $T$  denote the number of days that elapse before a high-risk driver is involved in an accident. Assume  $T$  is exponentially distributed with unknown parameter  $\beta$  (your book's notation (2.50a)). An insurance company expects that 30% of high-risk drivers will be involved in an accident during the first 50 days of the calendar year. What proportion of high risk drivers are expected to be involved in an accident during the first 80 days of a calendar year?