Econ 103 – Quiz 2

Name: _____

Instructions: This is closed-book, closed-notes quiz. Please write your answers in the blanks provided. Each question is worth one point but no partial credit will be awarded. Non-programmable calculators are permitted.

1. Let X be a discrete random variable denoting the number of days it will rain within a 2 day interval and Y denotes the number of days it will snow. The following table represents the joint PMF of X and Y denoted by $P(X, Y)$.

		Y		
		0	1	2
X	0	$1/20$	$2/20$	$4/20$
	1	$5/20$	$1/20$	$3/20$
	2	$1/20$	$2/20$	$1/20$

Calculate (1 point each):

1. The probability that it will rain on one day only.
2. The probability that it will snow on one day only.
3. The probability that it will rain on one day only and it will snow on one day only.
4. The probability that it will rain on one day only, given that it will snow on one day only.
5. Are the random variables X and Y independent?

1. _____

2. Let X be a random variable with support set {2,3,-1} where $p(2) = p(3) = p(-1)$. Calculate $E[X^2]$

2. _____

3. X and Y are random variables. Write $Var(aX + bY)$ in terms of $Var(X), Var(Y)$ and $Cov(X, Y)$.

3. _____

4. An employer uses a lie detector test to try and figure out which of her employees may be thieves. She knows that 1% of her workers steal from her supply closet. The lie detector test is 90% effective – if a thief takes it, 90% of the time they will fail the test, and if an honest employee takes it, they will *pass* 90% of the time. An employee failed the test. What is the probability that they are a thief?

4. _____

5. A six sided fair die is randomly rolled 3 times. What is the probability **in fraction** that you get at least one 6?

5. _____

6. A and A^C are mutually exclusive and collectively exhaustive. True or false?

6. _____

7. $P(A \cap A^C) = 1$. True or false?

7. _____