

## CSE 4214 :: Problem Set 1

1. Consider a fair die, with  $p(1) = p(2) = \dots = p(6) = 1/6$ . Suppose the die is thrown twice. What is the probability that the sum of the two throws is at least 10?
2. Considering the fair die from question 1, what is the probability that the first die roll was 5, given that the sum of the two die rolls is 8?
3. Let  $X$  and  $Y$  be random variables with variances  $\text{Var}[X]$  and  $\text{Var}[Y]$ , respectively. If  $X$  and  $Y$  are independent, show that  $\text{Var}[X + Y] = \text{Var}[X] + \text{Var}[Y]$ .
4. Let  $W$  be a continuous-valued random variable with the uniform distribution, as follows:

$$f(w) = \begin{cases} 1/2, & -1 \leq w \leq 1, \\ 0 & \textit{otherwise}. \end{cases}$$

What is the probability that  $|w| > 0.5$ ?

5. Find the mean and variance of the random variable  $W$  from question 4.