

# Homework 4: 9/19 - 9/23

STA 335

Due 11:59pm Monday, September 26

Name: \_\_\_\_\_

**Instructions:** Write-up complete solutions to the following problems and submit answers on Gradescope. Your solutions should be neatly-written, show all work and computations, include figures or graphs where appropriate, and include some written explanation of your method or process (enough that I can understand your reasoning without having to guess or make assumptions). A rubric for homework problems appears on the final page of this assignment.

- Unless otherwise noted, problem numbers are taken from the 2nd edition of Blitzstein and Hwang's *Intro to Probability*.

## Monday 9/19

### Chapter 3

39, 47

### Additional Problems

AP1. Let  $X$  be a discrete random variable with PMF  $p(n) = \frac{1}{2^{n+1}}$  for integers  $n \geq 0$ , and let  $Y = 2^X$ . What is the support of  $Y$ ? Find a formula for the pmf of  $Y$  and compute  $P(Y = 1)$ .

AP2. Suppose  $X$  and  $Y$  are independent discrete random variables with PMFs  $p_X$  and  $p_Y$ , defined on the non-negative integers. Let  $Z = X + Y$ . Find a formula for the PMF  $p_Z$  of  $Z$  in terms of  $p_X$  and  $p_Y$ . *Hint: LoTP*

## Wednesday 9/21

### Chapter 4

12, 15, 83

## Friday 9/23

### Chapter 4

11, 26, 63

**General Rubric**

Points	Criteria
5	The solution is correct <b>and</b> well-written. The author leaves no doubt as to why the solution is valid.
4.5	The solution is well-written, and is correct except for some minor arithmetic or calculation mistake.
4	The solution is technically correct, but author has omitted some key justification for why the solution is valid. Alternatively, the solution is well-written, but is missing a small, but essential component.
3	The solution is well-written, but either overlooks a significant component of the problem or makes a significant mistake. Alternatively, in a multi-part problem, a majority of the solutions are correct and well-written, but one part is missing or is significantly incorrect
2	The solution is either correct but not adequately written, or it is adequately written but overlooks a significant component of the problem or makes a significant mistake.
1	The solution is rudimentary, but contains some relevant ideas. Alternatively, the solution briefly indicates the correct answer, but provides no further justification
0	Either the solution is missing entirely, or the author makes no non-trivial progress toward a solution (i.e. just writes the statement of the problem and/or restates given information)
<b>Notes:</b>	<p>For problems with multiple parts, the score represents a holistic review of the entire problem.</p> <p>Additionally, half-points may be used if the solution falls between two point values above.</p>