

Homework 4

Math 262

due 5:00pm on Wednesday, September 27

Write your solutions to the following problems clearly and neatly. Make sure to explain your reasoning and provide mathematical details that support your answers. For a few tips on writing solutions, see [this helpful guide for mathematical writing](#).

You may write or type your solutions electronically, or write them on paper and scan or photograph them. Upload a single file containing your solutions to the [Homework 4](#) assignment on Moodle.

Warm-Up

Read [“Everyone Can Learn Mathematics to High Levels: The Evidence from Neuroscience that Should Change our Teaching”](#) by Jo Boaler and answer one of the following two questions:

- (a) What is the evidence from neuroscience that Boaler describes in this article? How could this neuroscience evidence apply to learning probability theory?
- (b) In what ways have you experienced a fixed mindset or a growth mindset in your educational journey? How might awareness of your mindset help you learn new concepts or skills?

Book Problems

- Section 1.4 #76 (page 42)
- Section 1.5 #81, 88, 91, 93 (pages 47–50)

Note: #88 has two possible answers

- Section 1.6 #101a (page 56)

You may do this simulation in R, Mathematica, or your favorite programming language.

Additional Problems

1. Show that $\binom{n}{k} = \binom{n-1}{k-1} + \binom{n-1}{k}$, where $1 \leq k \leq n$.
2. A total of n independent tosses of a coin that lands on heads with probability p are made. How large need n be so that the probability of obtaining at least one head is at least $\frac{1}{2}$? (The answer depends on p , of course.)