Homework 4

MATH 262

due 5:00pm on Wednesday, February 25

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 PDF 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.)