Homework 2

MATH 262

due 5:00pm on Monday, February 16

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. Either way, make sure your solutions are easy to read, in order, and clearly labeled. Upload a single PDF file containing your solutions to the Homework 2 assignment on Moodle.

Warm-Up

Read "Even Poincare Made Mistakes: Tales of Success through Failure" by Kristen Mazur (available here or here) and answer one of the following two questions:

(a) In your own mathematical journey, how have you experienced failure lead to growth? Explain.

(b) What strategies can you think of that will help you turn inevitable moments of failure into growth opportunities?

Book Problems

- Section 1.2 #17, 24 (pages 18–20)
- Section 1.3 #31, 32, 33, 34 (pages 31–33)

Additional Problems

1. There are n socks (3 of which are red) in a drawer. What is the value of n such that when 2 of the socks are chosen, the probability that both are red is $\frac{1}{2}$? What assumptions are being made?

2. A poker hand consists of 5 cards dealt from a standard 52-card deck.* If it is assumed that all poker hands are equally likely, what is the probability of being dealt:

   (a) A flush? (A hand is said to be a flush if all 5 cards are of the same suit.)

   (b) One pair? (This occurs when the cards have ranks a, a, b, c, d, where a, b, c, and d are all distinct.)

   (c) Two pairs? (This occurs when the cards have ranks a, a, b, b, c, where a, b, and c are all distinct.)

   (d) Three of a kind? (This occurs when the cards have ranks a, a, a, b, c, where a, b, and c are all distinct.)

   (e) Four of a kind? (This occurs when the cards have ranks a, a, a, a, b, where a and b are distinct.)

*A standard 52-card deck consists of 13 cards of each of the four *suits*: clubs (♣), diamonds (♢), hearts (♡), and spades (♠). Within each suit, each of the 13 cards has a different *rank*: ace, king, queen, jack, $10, 9, \ldots, 2$.