
UNIVERSITY OF TEXAS AT AUSTIN

Quiz #1

Prerequisite material.

Provide your **complete solution** to the following problems:

Problem 1.1. (5 points) Emmanuel entered an extra special kind of game with his friend Fischer. First, they toss a fair coin. If the coin comes up heads, Emmanuel gives \$5,000 to Fischer. If the coin comes up tails, Fischer gives \$2,000 to Emmanuel. Then, regardless of the outcome of the first cointoss, they toss the same fair coin again. If it comes up heads, Emmanuel gives Fischer \$4,000. If the coin comes up tails, Fischer gives \$3,000 to Emmanuel. What is the expected cashflow, i.e., what is the expected amount of money that changes hands and who gives it to whom?

Problem 1.2. (10 points) Harry plays a simple lottery in which the winnings are distributed as follows:

- \$0 with probability 0.1,
 - \$10 with probability 0.3,
 - \$20 with probability 0.6.
- (i) (3 points) What is the expected value of the amount Harry wins?
- (ii) (7 points) Unfortunately, there is a catch to the lottery Harry plays. It turns out that Harry has to pay a fee to collect his winnings. If the actual amount he wins is smaller than \$15, then the fee is defined to equal the amount that Harry won – thus, he walks away with nothing. If the actual amount he wins is larger than \$15, then he pays the \$15-fee and pockets the remainder. What is the expected value of the net amount Harry collects?