Statistics I — Quiz 1 (2024-09-09)

Name: **Roll number:**

A group of 20-year old students are all given 100 rupees. They have the option of investing the money for ten years in two different schemes.

In **scheme A**, they get a fixed interest rate of 25% every year, so that they have 125 rupees at the end of year one, 156.25 rupees at the end of year two, and so on, to have 931.32 rupees at the end of ten years.

In **scheme B**, they have to invest all their money in a high-risk high-reward game, where at the end of every year, their money is either doubled (with probability 0.5) or becomes half (with probability half). In other words, if they start with 100 rupees at the beginning of a year, they either have 200 rupees or 50 rupees (with equal probability) to invest at the beginning of the next year.

Answer the following questions in the question paper itself:

1. In a *large* group of students who choose scheme B, what is the average amount (total amount divided by number of students) each student will have after ten years?

    (a) Make a guess (before doing any computations):

    (b) Simulate scheme B 10000 times and report the observed mean:

2. What is the probability that someone choosing scheme B will have at least 100 rupees at the end of 10 years?

    (a) Guess (before doing any computations):

    (b) Answer (after suitable computations):

3. What is the probability that someone choosing scheme B will have at least 931.32 rupees at the end of 10 years?

    (a) Guess (before doing any computations):

    (b) Answer (after suitable computations):

4. If 10000 students all choose scheme B, then at the end of 10 years, roughly what proportion of the total wealth will 10% of the richest students have?

    Your answer:

On the other side of this page, *very* briefly outline the approach you have taken to compute your answers.