Blackboard exam 5, Mathematics Mathematics 2501, Section TR2 Starts: 2:15 pm, Thurs, May 14; ends: 3:30 pm. Instructor: Attila Máté

Follow these instructions carefully:

Your explanations count for much more that simple correct answers. Your wording must be your own; using my words will not earn any credit; your explanations must indicate that you understand the material, not simply copy the explanations from somewhere else.

You must work on your own; collaboration will inevitably show up with similar wordings of the explanations and invalidate your answer.

Clear signs of cheating will be taken seriously.

Blackboard allows, but it will indicate, late submissions.

1. Let X be the random variable with density function

$$f_X(x) = \begin{cases} 4x^3 & \text{if } 0 \le x \le 1, \\ 0 & \text{otherwise.} \end{cases}$$

- a) Find the expectation of X.
- b) Find the variance of X.

3. A pair of fair coins are tossed 1200 times. Let X denote the number of times both coins come up head.

- a) Write a formula for the probability P(X = k) $(0 \le k \le 1200)$.
- b) Write the sum for the exact probability that $290 \le X \le 310$.
- c) Use a well-known approximation to calculate the approximate probability that $290 \le X \le 310$.