## Math 101 Homework

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Complete the following problems. Fully justify each response.

- 1. Let A, B be events in a probability space. Prove that  $\mathbb{1}_A \mathbb{1}_B = \mathbb{1}_{A \cap B}$ .
- 2. Let X be the random variable that gives the outcome of a single roll of a fair 20-sided die, labeled with 1-20.
  - (a) Calculate  $\mathbb{E}(X)$ .
  - (b) Calculate Var(X).