

Worksheet #24; date: 11/28/2018
MATH 55 Discrete Mathematics

1. Show that the expected value of a random variable with a geometric distribution is $1/p$.
2. What is the expected number of times we need to reroll a die until we get a 5 or above?
3. Prove or disprove: if X and Y satisfies $E(XY) = E(X)E(Y)$ then they are independent.
4. Prove or disprove: $E[f(X)] = f(E[X])$ for any function f .
5. (*Challenging*) Prove or disprove: if X and Y satisfies $E[f(X)g(Y)] = E[f(X)]E[g(Y)]$ for any function f and g , then X and Y are independent.
6. What is the expected value of the sum of two die rolls? What is the expected value of the product of two die rolls?
7. Suppose we flip a coin 10 times. The first flip is a fair coin toss, but for the rest of the tosses we did not flip it well so it has $2/3$ chance of being the outcome as the previous toss. What is the expected number of heads?