Random Variables and Distribution Functions*

Worksheet 9

1. Choose two number at random from $\{1, 2, 3, 4, 5\}$. Let X be first value and and Y be the second.
   (a) Make a table for the joint mass function $f_{X,Y}(x, y)$
   (b) Find the mass function for $Z = X + Y$.
   (c) Simulate 10000 samples of Z. With these simulations, use the `table` command to see how well the sample matches the mass function for Z. Report your findings.
2. Let X be a continuous random variable with the logistic distribution function
$$F_X(x) = \frac{1}{1 + e^{-x}}.$$
   (a) Use the probability transform to create 100 samples with this distribution.
   (b) Compare the three quartiles to that of the simulated values.
   (c) Display on one graph both the distribution function and two simulated empirical cumulative distribution functions.
   (d) How well does the empirical distributions match $F_X(x)$?
   (e) Repeat the parts (b) through (e) for 1000 samples