

Introduction to Probability
Tutorial 7

1. An office has 4 copying machine, and the random variable X measures how many of them are in use at a particular moment in time. Suppose that $P(X = 0) = 0.08$, $P(X = 1) = 0.11$, $P(X = 2) = 0.27$ and $P(X = 3) = 0.33$.
 - (a) What is $P(X = 4)$?
 - (b) Draw a line graph of the probability mass function.
 - (c) Construct and plot the cumulative distribution function.
 - (d) What is the expected number of copying machines at a particular moment in time?
 - (e) Calculate the variance and standard deviation of the number of copying machines in use at a particular moment.

2. A fair coin is tossed 3 times. A player wins \$1 if the first toss is a head, but loses \$1 if the first toss is a tail. Similarly, the player wins \$2 if the second toss is a head, but loses \$2 if the second toss is a tail, and wins or loses \$3 according to the result of the third toss.

Let the random variable X be the total winnings after the 3 tosses (possibly a negative value if losses are incurred).

 - (a) Construct the probability mass function.
 - (b) Construct the cumulative distribution function.
 - (c) What is the most likely value of the random variable X ?

3. The figure presents the cumulative distribution function of a random variable. Make a table and line graph of its probability mass function.

	$F(x)$
$-\infty \leq x < -4$	0.00
$-4 \leq x < -1$	0.21
$-1 \leq x < 0$	0.32
$0 \leq x < 2$	0.39
$2 \leq x < 3$	0.68
$3 \leq x < 7$	0.81
$7 \leq x < \infty$	1.00