6.1. Calculate probabilities using the uniform distribution rule, combinatorics, and permutation equations.

Ex: A population contains 6 women and 7 men.

1. What is the probability that we select a group of size 5 that contains 2 women and 3 men?

6.2. For a discrete random variable X, *that is NOT a specific family of random variables.*

Ex: Let X be the number of times that a randomly selected driver (from a large population) had to take their drivers test before passing. The probabilities for each value of X is given in the table below.

X	P(X=x)
1	0.8
2	0.15
3	0.05

1. What is the mean of X?

2. What is the variance of X?

3. What is the standard deviation of X?

6.3. For a Bernoulli random variable X.

Ex: Let Y represent a random variable that =1 if a randomly selected UIUC applicant got was accepted into UIUC and =0 if they were not accepted into UIUC. We know that P(Y=1)=0.62.

1. What kind of random variable is Y?

2. What is P(Y=0)?

3. What is the mean of Y?

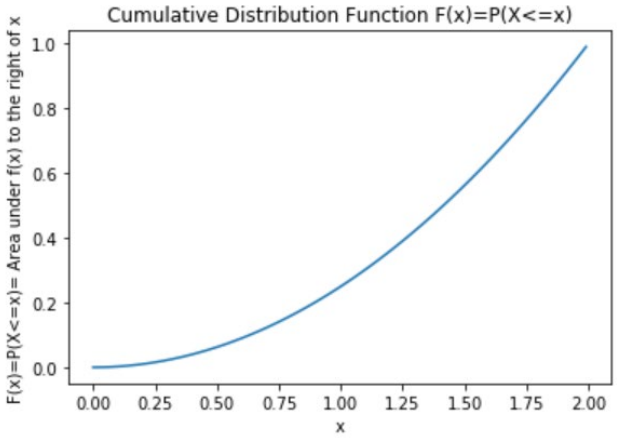
4. What is the variance of Y?

5. What is the standard deviation of Y?

6.4 For a continuous random variable X, *that is not of a specific family of random variables.*

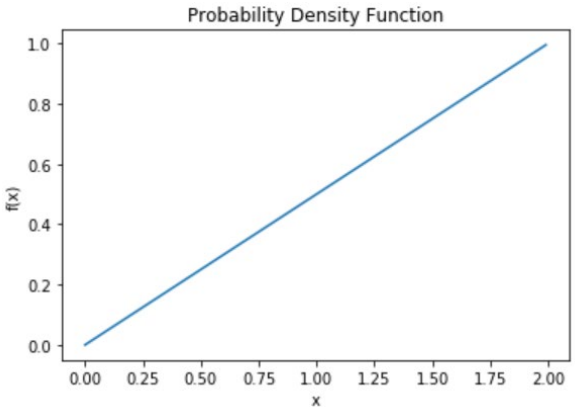
Ex: The probability density function and the cumulative distribution functions for a certain continuous random variable below.

1. Use the cdf to calculate P(X≤1.5).



2. Use the cdf to calculate P(X>1.5).

3. Use the pdf to calculate P(X≤1.5).



4. Use the pdf to calculate P(X>1.5).

6.7 Calculate probabilities using the rules of combining probabilities.

Ex: Let A be the event of randomly selecting a student from a calculus class that got an A on the final exam. Let B the event of randomly selecting a student from a calculus class that got a B on the final exam. Suppose the P(A)=0.2 and P(B)=0.6.

1. Are A and B mutually exclusive?

2. Are A and B independent or dependent?

3. What is the probability of randomly selecting a single student that got both an A and a B on the exam?

4. What is the probability of selecting a student that got an A or a B on the exam?

5. Finally, let the event 'passed' be the event that the randomly selected calculus student passed the final exam. Suppose that P(passed)=0.95. What is the probability that the student got an A on the final exam, given that we know that the student passed the final exam?