# AN INTRODUCTION TO PROBABILITY 

J. Calvin Berry<br>Mathematics Department<br>University of Louisiana at Lafayette

August 2011 edition
(c) 2011 J. Calvin Berry

## Table of Contents

Chapter 1
Preliminaries ..... 1
1.1 The setting ..... 1
1.2 Some representative examples ..... 1
1.3 Sample space and events ..... 4
Chapter 2
Probability ..... 8
2.1 Probability measures ..... 8
2.2 Properties of probability measures ..... 8
2.3 Discrete sample spaces ..... 10
Chapter 3
Combinatorics and examples ..... 12
3.1 Fundamental rule of counting ..... 12
3.2 Ordered samples ..... 12
3.3 Subpopulations and partitions ..... 14
Chapter 4
Conditional probability ..... 21
Chapter 5
Discrete random variables ..... 26
5.1 Random variables ..... 26
5.2 Distributions of discrete random variables ..... 27
5.3 Joint, marginal, and conditional discrete distributions ..... 35
5.4 Sums of independent nonnegative integer valued random variables ..... 39
Chapter 6
Expectation for discrete random variables ..... 41
6.1 Expected value ..... 41
6.2 Moments ..... 43
6.3 Variance ..... 44
6.4 Examples ..... 45
6.5 Covariance ..... 45
Chapter 7
Continuous random variables ..... 49
7.1 Cumulative distribution functions and continuous random variables ..... 49
7.2 Joint, marginal, and conditional continuous distributions ..... 52
Chapter 8
Expectation for continuous random variables ..... 57

