

Will's Guide To Life, Volume 2

Math 124, Fall 2007

Chapter 6

Section 6.4

Bayes' Theorem. How to calculate the probability of the result of a step in a multistep experiment given a specific result. Note that, in general, $\Pr(E|F) \neq \Pr(F|E)$.

Bayes' Theorem: $\Pr(F_j|E) = \frac{\Pr(F_j)\Pr(E|F_j)}{\Pr(E)}$. The Transfer Problem.

Section 6.5

Independence and Repeated Trials: Know the definitions for this section. Two events E and F are independent if $\Pr(E \cap F) = \Pr(E)\Pr(F)$, alternatively $\Pr(E|F) = \Pr(E)$. There is a theorem about independence of events and their complements. Independence of n events when $n > 2$. Trials and repeated trials, specifically applications with Bernoulli Trials. How to reduce any experiment to a Bernoulli Trial. Bernoulli Processes and Bernoulli's Formula

$\Pr(k \text{ successes}) = C(n, k)p^k q^{n-k}$.

Chapter 7

Section 7.1

Random Variables and Probability Distributions. Know the definitions for this section. Discrete, continuous and infinite random variables and the differences between them. How a probability distribution can be defined for a random variable. Bernoulli random variables and the binomial distribution. $b(k) = C(n, k)p^k q^{n-k}$. Drawing a histogram for a given distribution. The cumulative distribution function $B(x)$, often given as a table. The relation between the binomial distribution and the cumulative distribution.

$b(k) = B(k) - B(k - 1)$, and how to pick out a range of successes from the cumulative distribution.

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Section 7.2

Expected Value. Know the definitions for this section. For a random variable X taking on values x_i with probability p_i , $E(X) = x_1p_1 + x_2p_2 + \cdots + x_np_n$. The concept of a fair game, the expected value is zero. Means of distributions. For a binomial distribution of n trials with probability of success p , the mean is given by $\mu = np$. Sample means, $\bar{x} = \frac{x_1 + \cdots + x_n}{n}$. For an urn containing a red balls and b blue balls, the expected number of red balls when you draw n balls from the urn without replacement is $\mu = n\frac{a}{a+b}$.

Chapter 1

Section 1.2

Lines in the plane. Know the definitions for this section. Slope and intercepts of a line. Finding the slope given two points. Using the slope-intercept form to find the equation of a line given a point and the slope. The slope-intercept form of a line, most often how a line is given when graphing. ($y = mx + b$ form). General Linear Form of a line. How to go from one form of a line to another. Two lines are parallel if they have the same slope (and are distinct). Two lines are perpendicular if their slopes multiply out to -1 .

Section 1.3

Systems of Equations in Two Variables. Know the definitions for this section. Systems of equations have either 0, 1 or infinitely many solutions, geometrically, this is because two lines can cross at some point, are parallel, or are the same line. Consistent versus inconsistent systems and what type of lines they correspond to. Using the method of elimination to solve systems of equations. Breakeven analysis. Fixed, unit and total costs.

Section 1.4

Linear Inequalities and Half-Planes. Know the definitions for this section. The difference between open ($<$ or $>$) and closed (\leq or \geq) half-planes. Closed half-planes contain their boundary line. Finding corner points and using test points to graph a feasibility region. Polygonal wedges versus polygons in feasibility regions.

For more information, please go to:

<http://www.math.uiuc.edu/~wgreen4/math124.html>