Review Handout for Discrete PDFs

A.1. Discrete uniform $f(x;k) = \frac{1}{k}$	k = number of elements in sample space x = outcome is one distinct element
A.2. Binomial $b(x;n,p) = \binom{n}{x} p^x q^{n-x}$ Cumulative binomial in Table A.1 of WMM.	n = # of (independent, repeated, with replacement, only 2 outcomes) Bernoulli trials p = probability of success on one trial $q = 1 - p$ = probability of failure on one trial x = # of successes
A.3. Multinomial $m(\{x\};n,\{p\},k) = \binom{n}{x_1, x_2 ... x_k} \prod_{i=1}^{k} p_i^{x_i}$	k = # of different types of outcomes n = # of (independent, repeated, with replacement) Bernoulli trials p_i = probability of type i success on one trial x_i = # of successes of type i
A.4. Hypergeometric $h(x;N,n,k) = \frac{\binom{k}{x}\binom{N-k}{n-x}}{\binom{N}{n}}$ for $x = 0,1,2...n$	N = # of elements in population n = # of elements in sample, drawn without replacement k = # of outcomes labeled success in population x = # of successes in sample
A.5. Multivariate Hypergeometric $h_m(\{x\};N,n,\{a\},k) = \frac{\binom{a_1}{x_1}\binom{a_2}{x_2}\binom{a_3}{x_3}...\binom{a_k}{x_k}}{\binom{N}{n}}$	k = # of different types of outcomes N = # of elements in population n = # of elements in sample, drawn without replacement a_i = # of outcomes labeled success of type i in population x_i = # of successes of type i in sample
A.6. Negative Binomial $b^*(x;k,p) = \binom{x-1}{k-1} p^k q^{x-k}$ for $x = k, k+1, k+2...$	x = # of (independent, repeated, with replacement, only 2 outcomes) Bernoulli trials p = probability of success on one trial $q = 1 - p$ = probability of failure on one trial k = # of successes
A.7. Geometric $g(x;p) = pq^{x-1}$ for $x = 1,2,3...$	x = # of (independent, repeated, with replacement, only 2 outcomes) Bernoulli trials p = probability of success on one trial $q = 1 - p$ = probability of failure on one trial
A.8. Poisson $p(x;\lambda t) = \frac{e^{-\lambda t}(\lambda t)^x}{x!}$ for $x = 0,1,2...$	t = the size of the interval λ = the rate of the occurrence of the outcome x = the number of outcomes occurring in interval t. Cumulative Poisson PDF in WMM Table A.2.

Review Handout for Continuous PDFs

B.1. Continuous uniform $f(x;A,B) = \begin{cases} \frac{1}{B-A} & \text{for } A \le x \le B \\ 0 & \text{otherwise} \end{cases}$	A = lower limit of random variable B = upper limit of random variable x = outcome of uniform selection
B.2. Normal $f(x;\mu,\sigma) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$ Cumulative standard normal PDF given in Table A.3 of WMM, need $z = \frac{x-\mu}{\sigma}$	μ = population mean σ = population standard deviation x = random variable of normal PDF
B.3. Gamma $f_\Gamma(x;\alpha,\beta) = \begin{cases} \frac{1}{\beta^\alpha \Gamma(\alpha)} x^{\alpha-1} e^{-x/\beta} & \text{for } x > 0 \\ 0 & \text{elsewhere} \end{cases}$	α = # of events β = mean time to failure, or mean time between events (must have same units as x) x = time of interest Incomplete Gamma Function given in Table A.24 of WMM, need $y = \frac{x}{\beta}$
B.4. Exponential (gamma with $\alpha = 1$) $f_e(x;\beta) = \begin{cases} \frac{1}{\beta} e^{-x/\beta} & \text{for } x > 0 \\ 0 & \text{elsewhere} \end{cases}$	β = mean time to failure, or mean time between events (must have same units as x) x = time of interest
B.5. Chi-squared $f_{\chi^2}(x;v)$ Critical values of the Chi-squared distribution are given in Table A.5 of WMM.	v = n-1= degrees of freedom, x = random variable $\alpha = 1 - F_{\chi^2}(x;v) = P(X > x)$
B.6. t-distribution $f_t(x;v)$ Critical values of the t-distribution are given in Table A.4 of WMM.	v = n-1= degrees of freedom, x = random variable $\alpha = 1 - F_t(x;v) = P(X > x)$
B.7. F-distribution $f_F(v_1, v_2)$ Critical values of the F-distribution are given in Table A.6 of WMM.	$v_1 = n_1 - 1$ = degrees of freedom of variable 1 $v_2 = n_2 - 1$ = degrees of freedom of variable 2 $\alpha = 1 - F_F(x;v) = P(X > x)$