Stat 254: Final Exam Formula Sheet

$$P\left(A|B\right)=\frac{P\left(AB\right)}{P\left(B\right)}$$

$$P(S_i|A)=\frac{P(S_i)P(A|S_i)}{\sum P(S_j)P(A|S_j)}$$

$$E(x)=\sum x\,p(x)$$

$$\sigma^2=\sum\left(x-\mu\right)^2p(x)=\sum x^2p(x)-\mu^2$$

$$P\left(x=k\right)={}_nC_k\,p^kq^{n-k}$$

$$P\left(x=k\right)=\frac{\mu^ke^{-\mu}}{k!}$$

$$P(x=k)=\frac{{}_MC_k\;\;{}_{N-M}C_{n-k}}{{}_NC_n}$$

$$\mu=n\left(\frac{M}{N}\right)$$

$$\sigma^2=n\left(\frac{M}{N}\right)\left(\frac{N-M}{N}\right)\left(\frac{N-n}{N-1}\right)$$

$$\mu=\int_{-\infty}^{\infty}x\;f(x)dx$$

$$\sigma^2=\int_{-\infty}^{\infty}x^2\;f(x)dx-\mu^2$$

$$f(x)=\begin{cases}ke^{-kx} & \text{for } x\geq 0\\ 0 & \text{elsewhere}\end{cases}\qquad \text{where } \mu=\frac{1}{k}$$

$$z=\frac{x-\mu}{\sigma}\qquad\qquad z=\frac{\overline{x}-\mu}{\sigma/\sqrt{n}}$$

$$\mu = \overline{x} \pm z_{\alpha/2}\sqrt{\frac{\sigma^2}{n}}$$

$$\mu = \overline{x} \pm t_{\alpha/2}\sqrt{\frac{s^2}{n}}$$

$$p = \hat{p} \pm z_{\alpha/2}\sqrt{\frac{\hat{p}\hat{q}}{n}}$$

$$\frac{(n-1)s^2}{\chi^2_{\alpha/2}} \leq \sigma^2 \leq \frac{(n-1)s^2}{\chi^2_{(1-\alpha/2)}}$$

$1-\alpha$	0.9	0.95	0.98	0.99
$z_{\alpha/2}$	1.645	1.960	2.326	2.576
z_{α}	1.282	1.645	2.054	2.326

$$z = \frac{\overline{x} - \mu_0}{\sigma/\sqrt{n}}$$

$$z = \frac{\overline{x}_1 - \overline{x}_2 - D_0}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

$$t = \frac{\overline{x} - \mu_0}{s/\sqrt{n}}$$

$$t = \frac{\overline{x}_1 - \overline{x}_2 - D_0}{\sqrt{s^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \text{ where } s^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}$$

$$z = \frac{\hat{p} - p_0}{\sqrt{p_0 q_0/n}}$$

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}\hat{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \text{ where } \hat{p} = \frac{x_1 + x_2}{n_1 + n_2}$$

$$\chi^2 = \frac{(n-1)s^2}{\sigma_0^2}$$

$$\chi^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

$p < 0.01$	highly significant
$0.01 < p < 0.05$	significant
$0.05 < p < 0.1$	tending towards significance
$p > 0.1$	not significant